Southern Medical Journal

JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION

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JULY 1959

VOLUME 52 NUMBER 7

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Southern Medical Journal

JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION

EDITOR, R. H. KAMPMEIER, M.D.
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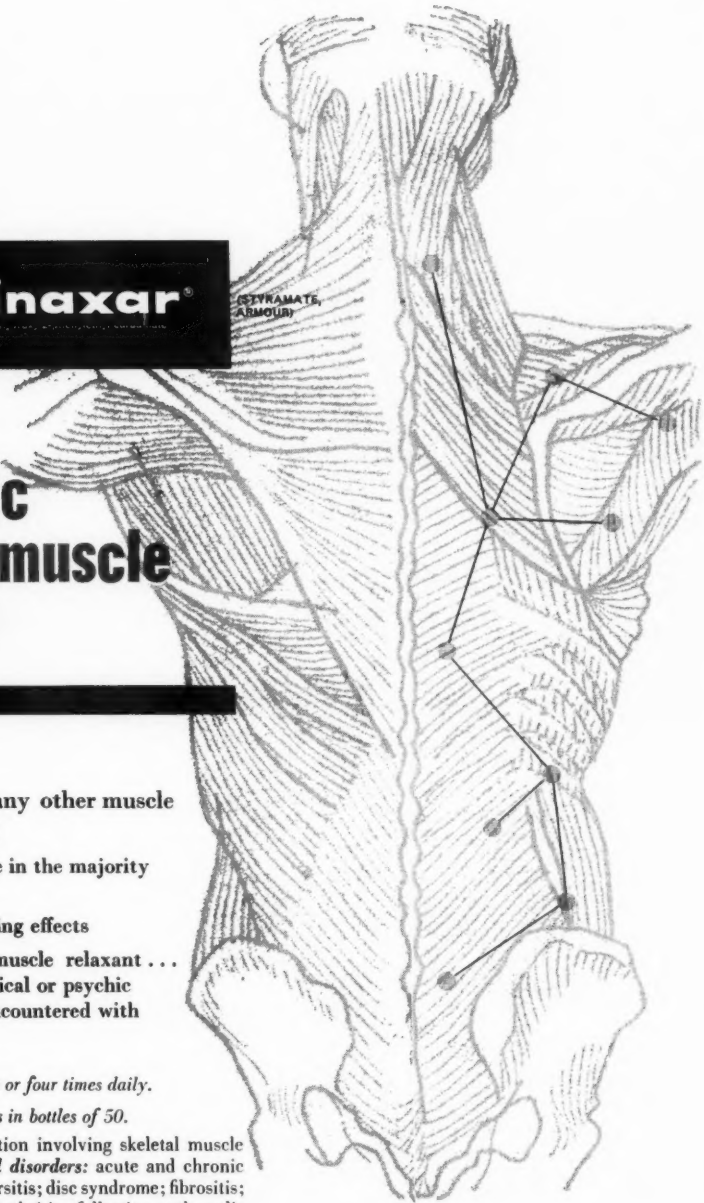

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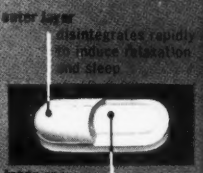

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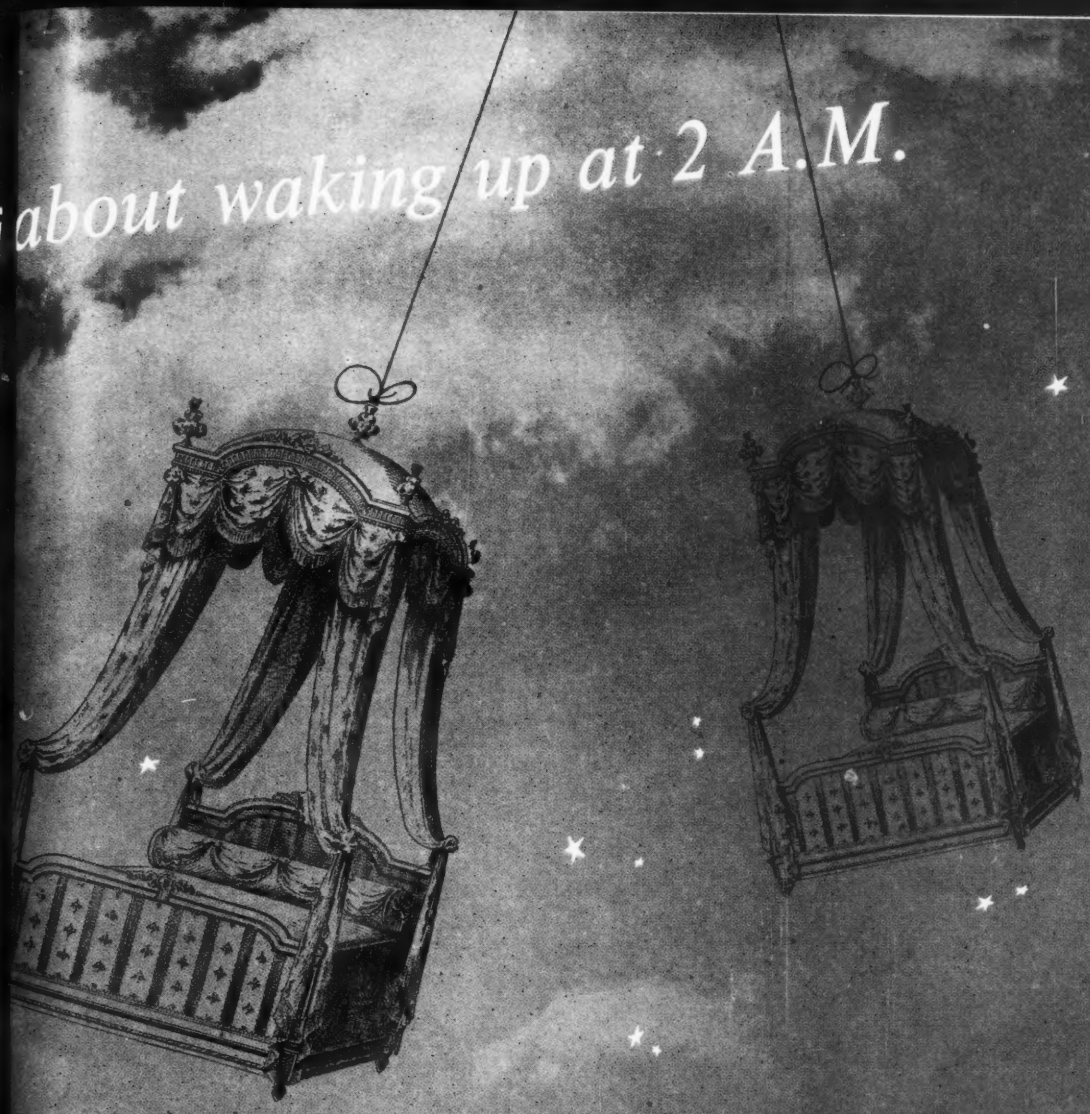

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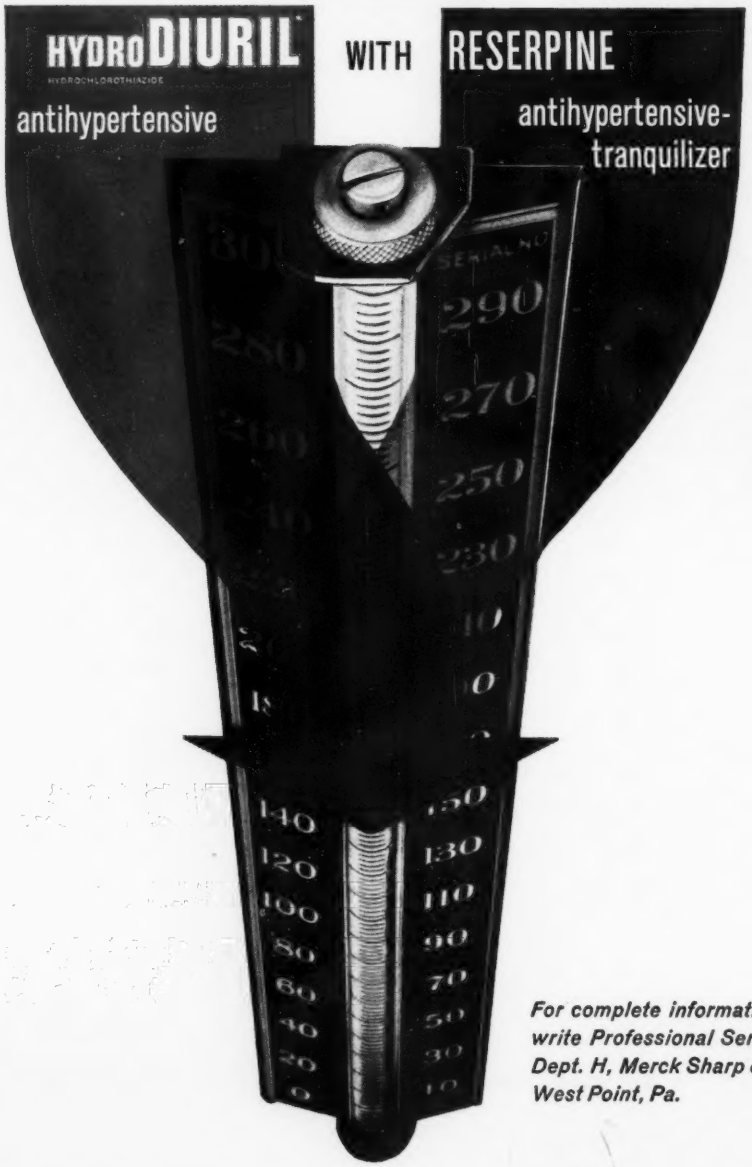

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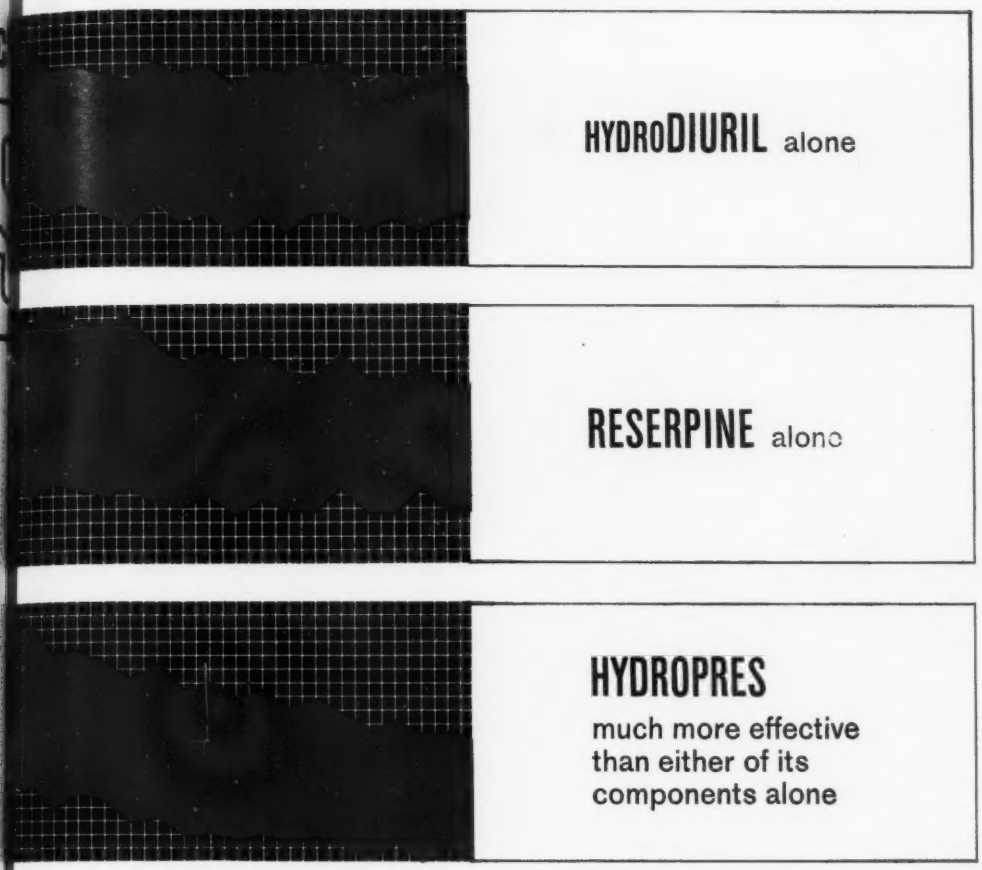

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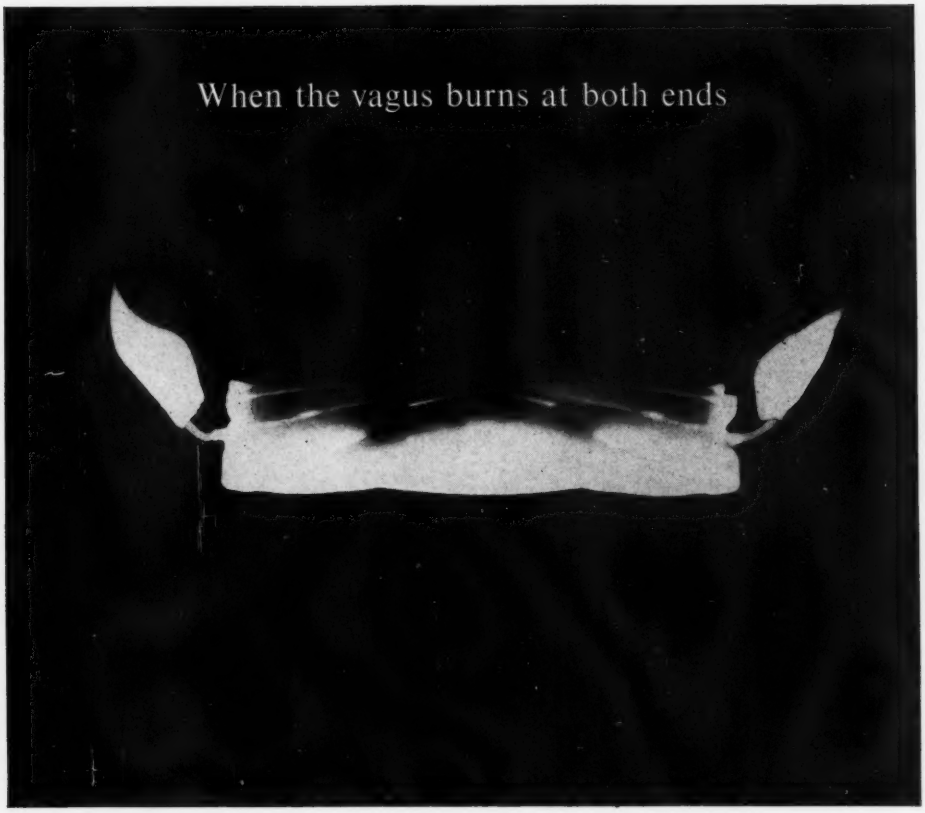

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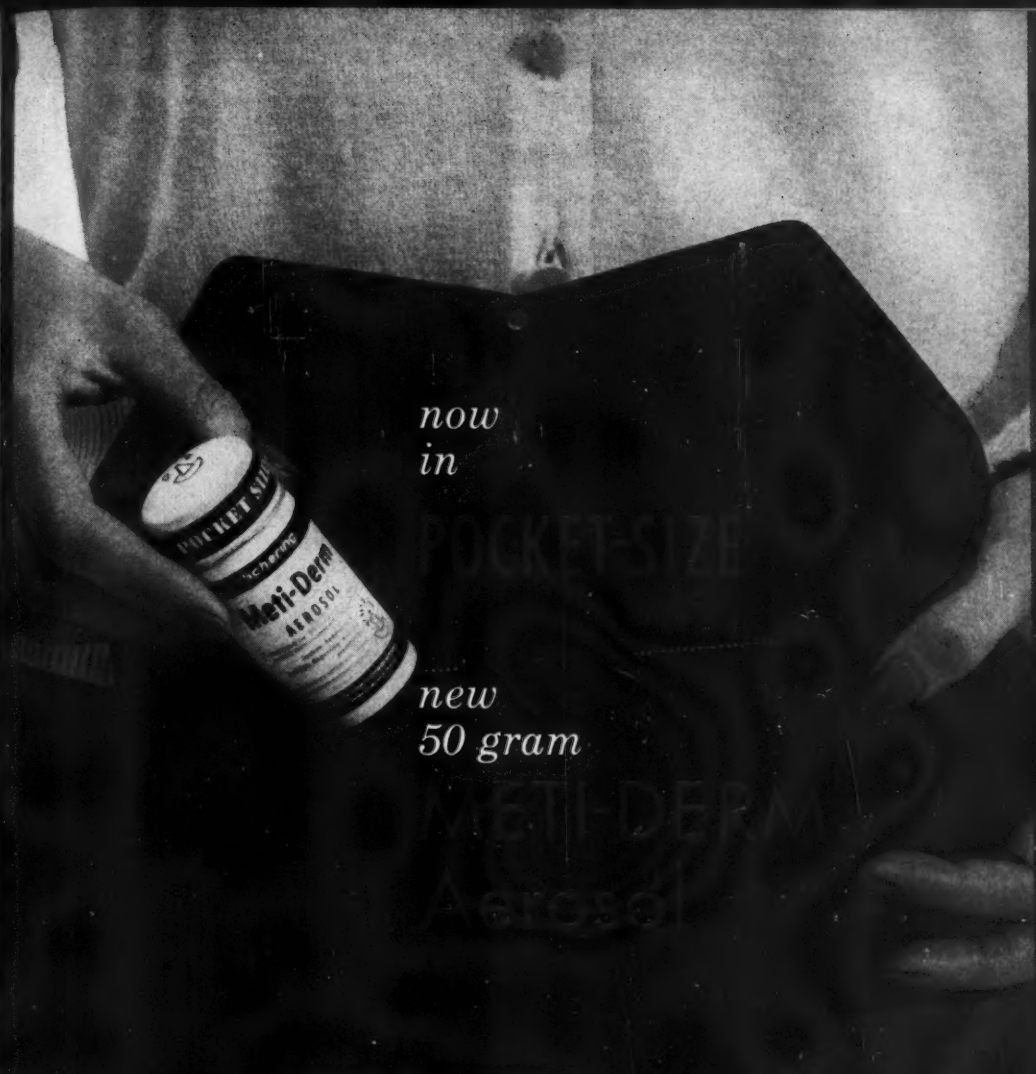

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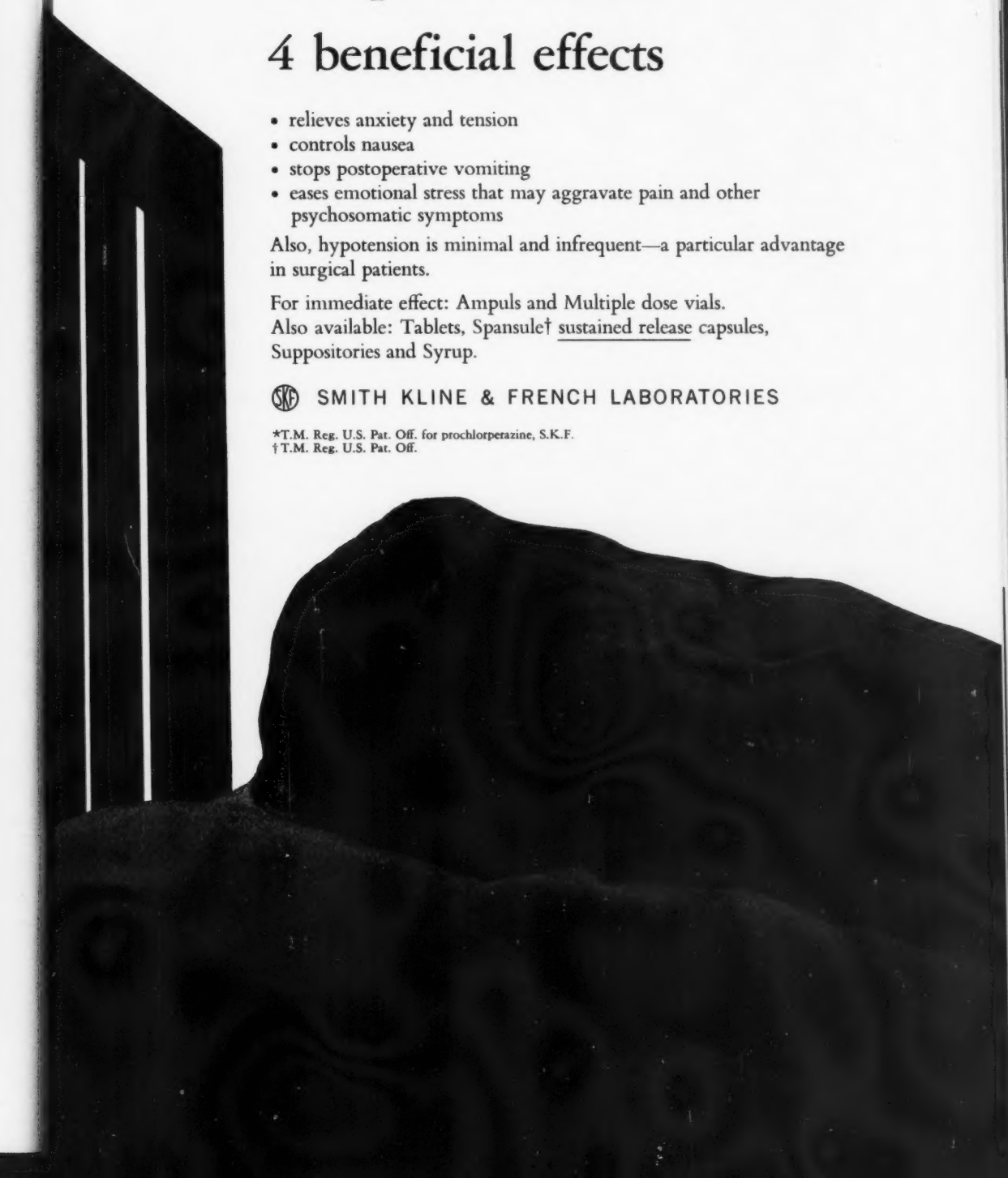

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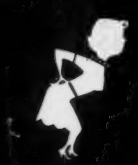

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a long-acting sympathomimetic . . . to lift the misery, combat lassitude and brighten the outlook . . . hasten recovery.

Employs the Durabond Principle . . . to act within minutes . . . relieve for hours . . . just one dose in the morning controls lacrimation, makes breathing easier, relieves itching—all day. And, one dose upon retiring keeps the patient symptom-free . . . allows uninterrupted rest all night.

1 or 2 tablets twice a day. For economy, prescribe in original packages of 100.

Each Durabond tabule contains: Chlorpheniramine tannate, 8 mg.; Pyrilamine tannate, 25 mg.; Tanphetamin (*d*-amphetamine tannate), 10 mg.

Neisler **IRWIN, NEISLER & CO.**
DECATUR, ILLINOIS

Butazolidin®

(phenylbutazone GEIGY)

tablets · alka capsules **potent · nonhormonal · anti-inflammatory agent**

BUTAZOLIDIN tablets or the Alka capsules are **equally effective but individually adaptable in a wide range of arthritic disorders.**

Recent clinical reports continue to justify the selection of Butazolidin for rapid relief of pain, increased mobility, and early resolution of inflammation.

Gouty Arthritis: "...95 per cent of patients experienced a satisfactory response..."[1]

Rheumatoid Arthritis: In "A total of 215 cases...over half, 50.7 per cent showed at least major improvement, with 21.8 per cent showing minor improvement...."[2] **Osteoarthritis:** 301 cases showed "...a total of 44.5 per cent with complete remission or major improvement. Of the remainder, 28.2 per cent showed minor improvement...."[3] **Spondylitis:** All patients "...experienced initial major improvement that was maintained throughout the period of medication."[3] **Painful Shoulder Syndrome:** Response of 70 patients with various forms showed "...8.6 per cent complete remissions, 47.1 per cent major improvement, 20.0 per cent minor improvement...."[3]

References: 1. Graham, W.: Canad. M. A. J. 79:634 (Oct. 15) 1958. 2. Robins, H. M.; Lockie, L. M.; Norcross, B.; Latona, S., and Riordan, D. J.: Am. Pract. Digest Treat. 8:1758, 1957. 3. Kuzell, W. C.; Schaffarzick, R. W.; Naugler, W. E., and Champlin, B. M.: New England J. Med. 256:388, 1957.

Availability BUTAZOLIDIN® (phenylbutazone GEIGY): Red coated tablets of 100 mg. BUTAZOLIDIN® Alka: Capsules containing BUTAZOLIDIN® (phenylbutazone GEIGY), 100 mg.; dried aluminum hydroxide gel, 100 mg.; magnesium trisilicate 150 mg.; homatropine methylbromide, 1.25 mg.

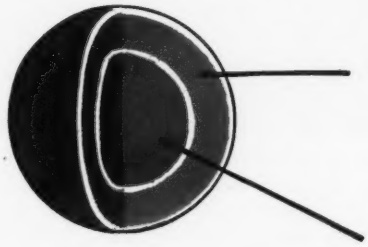
geigy

ARDSLEY, NEW YORK

02959

the complaint: "nervous indigestion"

the diagnosis: any one of several nonspecific gastrointestinal disorders requiring relief of symptoms by sedative-antispasmodic action with concomitant digestive enzyme therapy. **the prescription:** a new formulation, incorporating in a single tablet the actions of Donnatal and Entozyme. **the dosage:** two tablets three times a day, or as indicated.



the formula: *in the gastric-soluble outer layer:*

Hyoscyamine sulfate	0.0518 mg.
Atropine sulfate	0.0097 mg.
Hyoscine hydrobromide	0.0033 mg.
Phenobarbital (1/8 gr.)	8.1 mg.
Pepsin, N.F.	150 mg.

in the enteric-coated core:

Pancreatin, N.F.	300 mg.
Bile salts	150 mg.

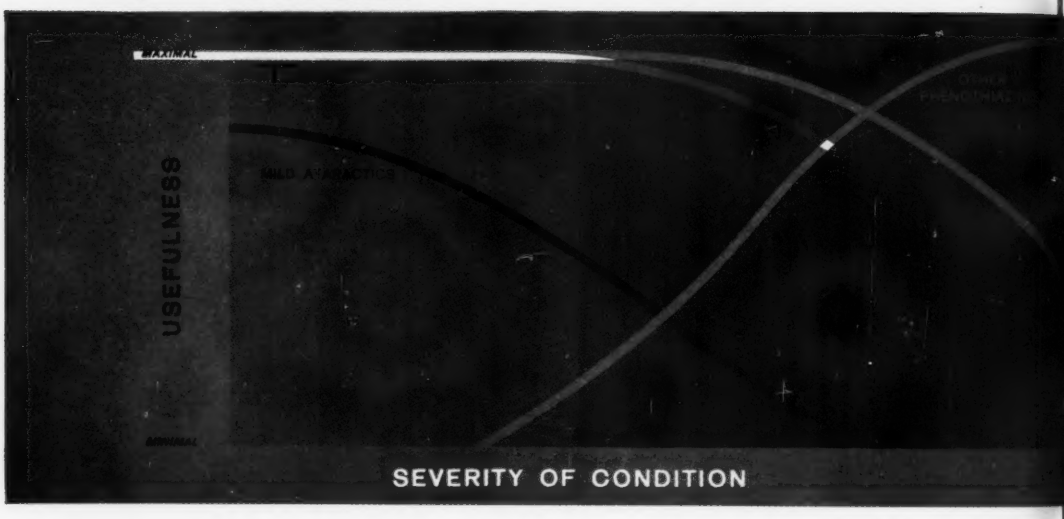
DONNAZYME™

Robins

A. H. ROBINS COMPANY, INCORPORATED • RICHMOND 20, VIRGINIA

new... highly effective tranquilizer for

Comparison of TENTONE usefulness



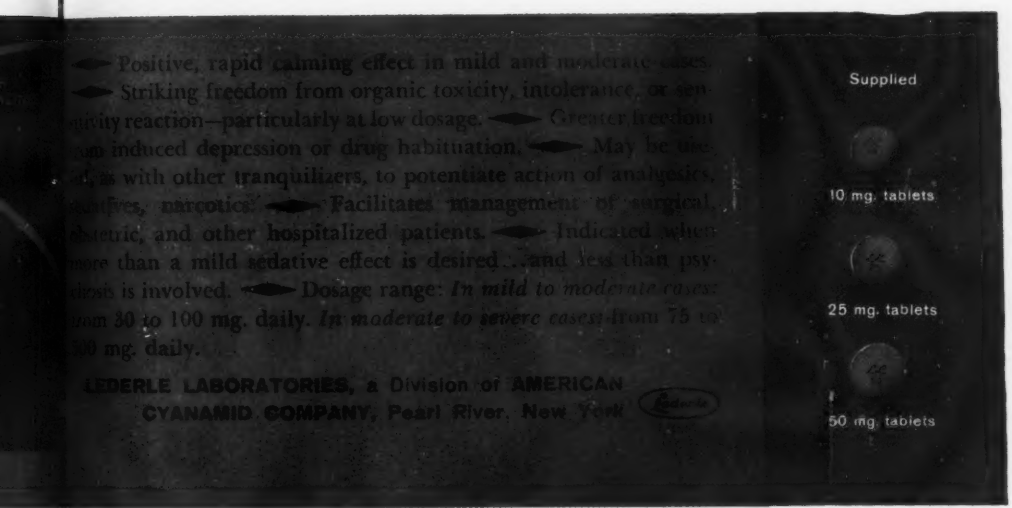
...zer. for extended office practice use

Tentone

Methoxypromazine Maleate

LEDERLE

NEW PHENOTHIAZINE COMPOUND FOR THE LOWER AND MIDDLE RANGE OF DISORDERS

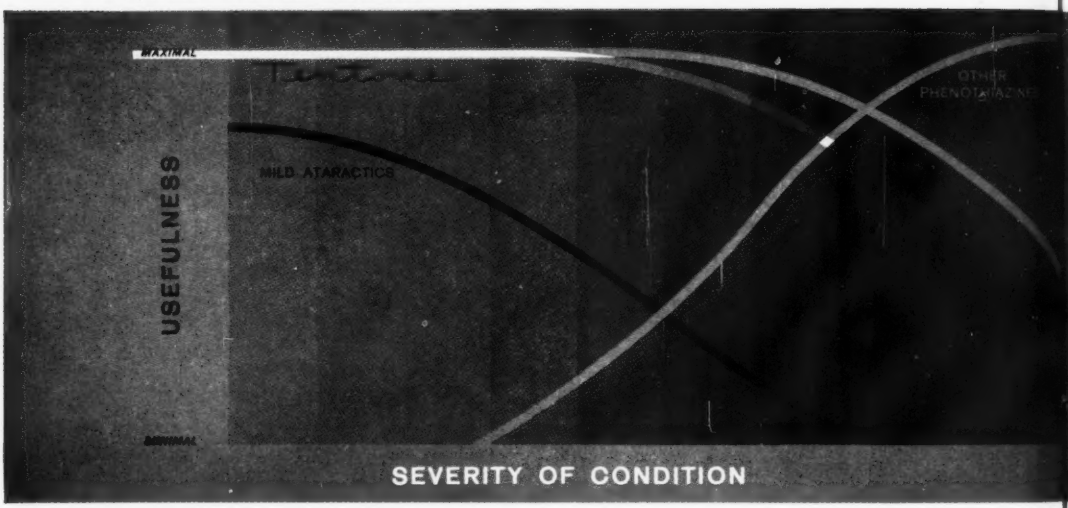

Positive, rapid calming effect in mild and moderate cases.
Striking freedom from organic toxicity, intolerance, or sensitivity reaction—particularly at low dosage.
Greater freedom from induced depression or drug habituation.
May be used, as with other tranquilizers, to potentiate action of analgesics, sedatives, narcotics.
Facilitates management of surgical, obstetric, and other hospitalized patients.
Indicated when more than a mild sedative effect is desired...and less than psychosis is involved.
Dosage range: In mild to moderate cases: from 30 to 100 mg. daily. In moderate to severe cases: from 75 to 150 mg. daily.
LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York
Supplied
10 mg. tablets
25 mg. tablets
50 mg. tablets

new... highly effective tranquilizer for

Methoxypromazine

NEW PHE

Comparison of TENTONE usefulness



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LEDER

...for extended office practice use

Tentone

Methoxypromazine Maleate

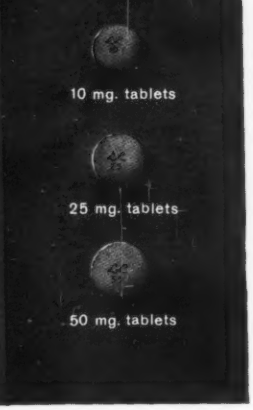
LEDERLE

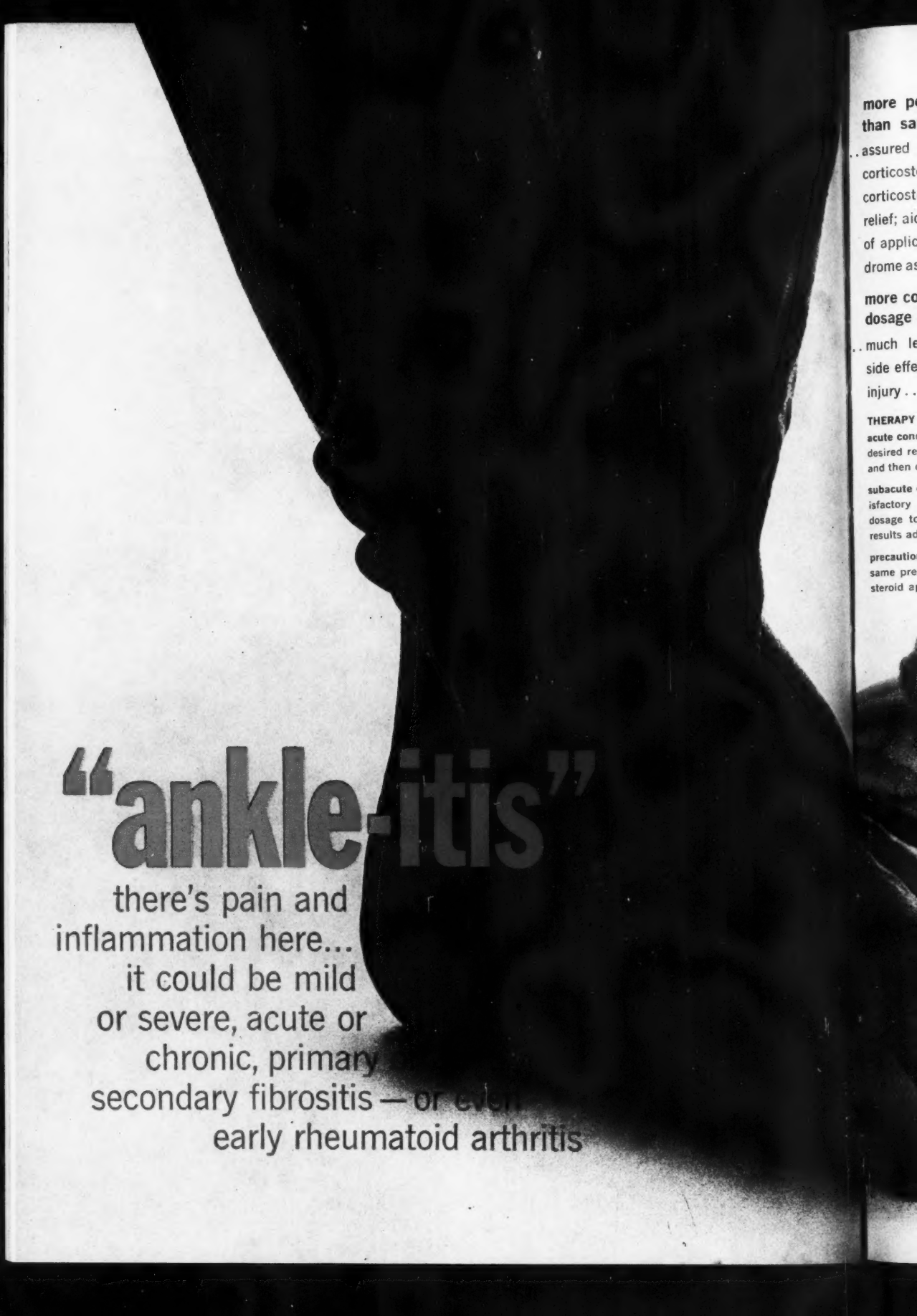
NEW PHENOTHIAZINE COMPOUND FOR THE LOWER AND MIDDLE RANGE OF DISORDERS

◆ Positive, rapid calming effect in mild and moderate cases. ◆ Striking freedom from organic toxicity, intolerance, or sensitivity reaction—particularly at low dosage. ◆ Greater freedom from induced depression or drug habituation. ◆ May be useful, as with other tranquilizers, to potentiate action of analgesics, sedatives, narcotics. ◆ Facilitates management of surgical, obstetric, and other hospitalized patients. ◆ Indicated when more than a mild sedative effect is desired... and less than psychosis is involved. ◆ Dosage range: *In mild to moderate cases:* from 30 to 100 mg. daily. *In moderate to severe cases:* from 75 to 200 mg. daily.

LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

Supplied




"ankle-itis"
there's pain and
inflammation here...
it could be mild
or severe, acute or
chronic, primary
secondary fibrositis — or
early rheumatoid arthritis

more potent and comprehensive treatment than salicylate alone

..assured anti-inflammatory effect of low-dosage corticosteroid[1] . . . additive antirheumatic action of corticosteroid plus salicylate[2-5] brings rapid pain relief; aids restoration of function . . . wide range of application including the entire fibrositis syndrome as well as early or mild rheumatoid arthritis

more conservative and manageable than full-dosage corticosteroid therapy—

..much less likelihood of treatment-interrupting side effects[1-6] . . . reduces possibility of residual injury . . . simple, flexible dosage schedule

THERAPY SHOULD BE INDIVIDUALIZED

acute conditions: Two or three tablets four times daily. After desired response is obtained, gradually reduce daily dosage and then discontinue.

subacute or chronic conditions: Initially as above. When satisfactory control is obtained, gradually reduce the daily dosage to minimum effective maintenance level. For best results administer after meals and at bedtime.

precautions: Because SIGMAGEN contains prednisone, the same precautions and contraindications observed with this steroid apply also to the use of SIGMAGEN.

in any case it calls for

Sigmagen®

corticoid-salicylate compound tablets

Composition

METICORTEN® (prednisone)	0.75 mg.
Acetylsalicylic acid	325 mg.
Aluminum hydroxide	75 mg.
Ascorbic acid	20 mg.

Packaging: SIGMAGEN Tablets, bottles of 100 and 1000.

References: 1. Spies, T. D., et al.: J.A.M.A. 159:645, 1955. 2. Spies, T. D., et al.: Postgrad. Med. 17:1, 1955. 3. Gelli, G., and Della Santa, L.: Minerva Pediat. 7:1456, 1955. 4. Guerra, F.: Fed. Proc. 12:326, 1953. 5. Busse, E. A.: Clin. Med. 2:1105, 1955. 6. Sticker, R. B.: Panel Discussion, Ohio State M. J. 52:1037, 1956.

Schering

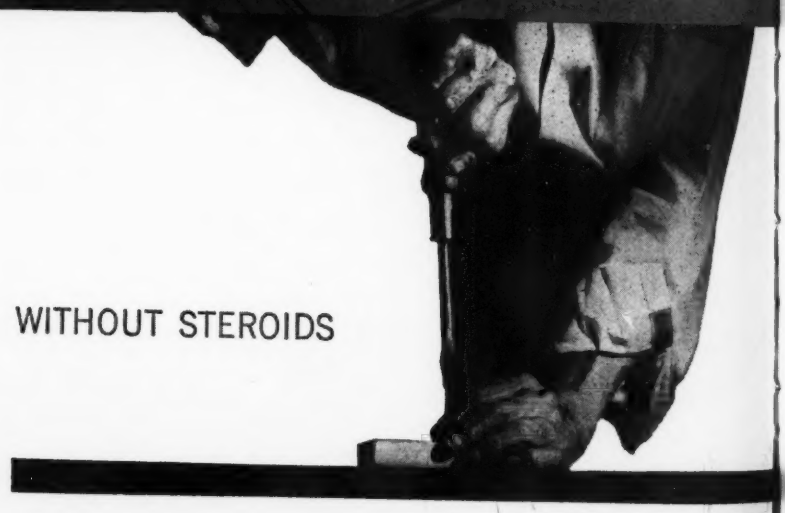
SG-J-618

WITHOUT STEROIDS

In every arthritic state

WITHOUT STEROIDS

WITHOUT STEROIDS



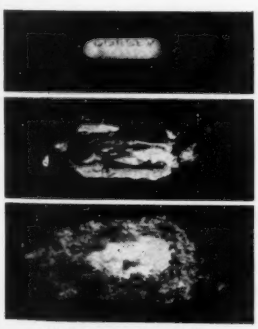
MAINTENANCE THERAPY WITHOUT STEROIDS IS FUNDAMENTAL

Sound, conservative therapy with salicylates has been consistently reaffirmed as basic, long-term maintenance therapy in the arthritides.

Buffered Pabirin provides superior maintenance therapy. It epitomizes fundamental long-term basic therapy since it can be given month after month without serious complications and with minimal problems to patient and doctor alike.

Buffered Pabirin is formulated to provide high and sustained salicylate blood levels. Each tablet consists of an outer layer containing a buffer (aluminum hydroxide), para-aminobenzoic acid, and ascorbic acid; a core of acetylsalicylic acid.

In the stomach, the outer layer quickly releases the buffer, which protects against nausea, dyspepsia and other gastrointestinal symptoms so frequently encountered with salicylates alone. The core of Buffered Pabirin then disintegrates rapidly, permitting rapid absorption of the acetylsalicylic acid for faster pain relief.



Photographs show 2-stage Tandem Release disintegration.

Each tablet contains:
Acetylsalicylic acid (5 gr.).....300 mg.
Para-aminobenzoic acid (5 gr.)....300 mg.
Ascorbic acid ..... 50 mg.
Dried aluminum hydroxide gel....100 mg.

All Buffered Pabirin is sodium- and potassium-free.

Dosage: Two or three tablets 3 or 4 times daily.

References: 1. Hart, D.; Bagnall, A. W.; Bunim, J. J., and Polley, F. H.: Ninth International Congress on Rheumatic Diseases, Toronto, Ont. (June 25) 1957. 2. Report of Joint Committee, Medical Research Council & Nuffield Foundation, Treatment of Rheumatoid Arthritis, British Medical Journal (April 13) 1957. 3. Friend, D. G.: New England J. Med. 257:278 (Aug.) 1957.

Buffered **Pabirin®** *Tablets*

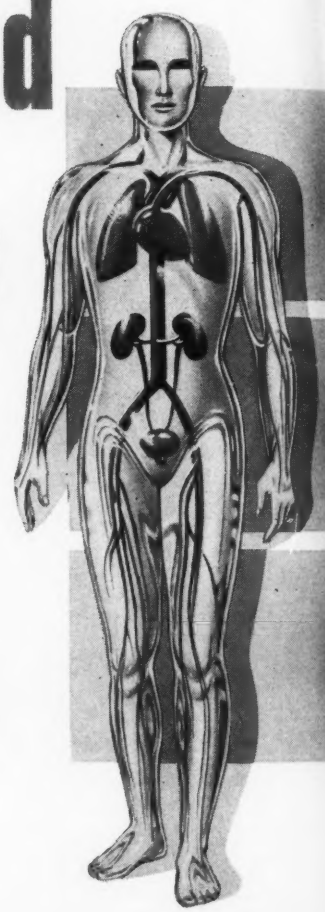
SMITH-DORSEY · a division of The Wander Company · Lincoln, Nebraska · Peterborough, Canada

NEW

HYDRODIURIL®

(HYDROCHLOROTHIAZIDE)

simplifies* and improves any regimen for hypertension



*it

*it's as easy as 1, 2, 3 to use

HYDRODIURIL™

(HYDROCHLOROTHIAZIDE)

1 Initiate therapy with HYDRODIURIL: one 25 mg. tablet or one 50 mg. tablet once or twice a day. HYDRODIURIL by itself often causes an adequate drop in blood pressure over a period of two to three weeks. This may be all the therapy some patients require.

2 Add or adjust other agents as required: HYDRODIURIL enhances the activity of all commonly-used antihypertensive agents; thus, the dosage of other medication (rauwolfia, reserpine, hydralazine, veratrum) should be initiated or adjusted as indicated by patient condition. If a ganglion-blocking agent is contemplated or being used, usual dosage must be reduced by 50 per cent.

3 Adjust dosage of all medication: the patient must be frequently observed and careful adjustment of all agents should be made to establish optimal maintenance dosage.

Supplied: 25 mg. and 50 mg. scored tablets HYDRODIURIL (Hydrochlorothiazide) bottles of 100 and 1,000.
Additional literature for the physician is available on request.

HYDRODIURIL is a trademark of Merck & Co., Inc. Trademarks outside the U. S.: DICHLOTRIDE, DICLOTRIDE, HYDROSALURIC.

MSD MERCK SHARP & DOHME, Division of Merck & Co., Inc., Philadelphia 1, Pa.

Clinical findings in 900 patients show the selective antihypertensive action of Singoserp

IN 735 PATIENTS, BLOOD PRESSURE FELL AN AVERAGE OF 30.7 mm. Hg:

- more than half of these patients suffered from **moderate to severe hypertension**
- more than half of the cases involved hypertension of at least 6 years' standing, with **many histories of up to 20 years' duration**

THE SIDE-EFFECTS PROBLEM WAS MINIMIZED IN MOST PATIENTS:

Chart shows gratifyingly low incidence of side effects in 233 patients given Singoserp with no other antihypertensive medication

Side Effect	Number	Per Cent
Lethargy	7	2.9
Headache	6	2.5
Gastrointestinal upset	3	1.2
Vertigo	2	0.8
Nasal congestion	1	0.4

DOSAGE: Initially, 1 to 2 tablets (1 to 2 mg.) daily.
SUPPLIED: Singoserp *Tablets*, 1 mg. (white, scored); bottles of 100.
Samples available on request. Write to CIBA, Box 277, Summit, N.J.

Singoserp®
(syrosingopine CIBA)

CIBA
SUMMIT, N.J.

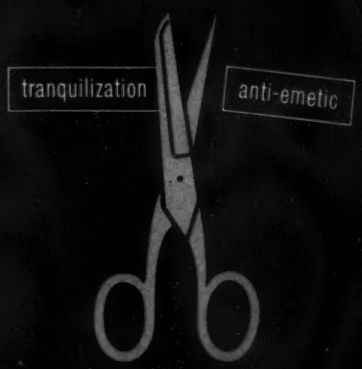
9/2687MK

remember
Serpasil®
(reserpine CIBA)
for the anxious hypertensive with or without tachycardia

a major improvement in rauwolfia

a major advance in antihypertensive therapy

now potent tranquilizer therapy is safer than ever



Virtual freedom of Mellaril from major toxic effects is due to greater specificity of tranquilizing action... divorced from such "dirtier" effects as anti-emetic action.

MELLARIL is virtually free of such toxic effects as

- jaundice
- Parkinsonism
- blood dyscrasia.

Thioridazine [MELLARIL] is as effective as the best available phenothiazine, but with appreciably less toxic effects than those demonstrated with other phenothiazines... This drug appears to represent a major addition to the safe and effective treatment of a wide range of psychological disturbances seen daily in the clinics or by the general practitioner."

SANDOZ

Mellaril®

THIORIDAZINE HCl

specific, effective tranquilizer •• safer at all dosage levels

remarkable lack of side effects

In more than 3,000 carefully-followed patients, Mellaril has been almost completely free of such major side effects as jaundice, extrapyramidal symptoms, Parkinsonism, blood dyscrasia, dermatitis even when given in quantities far in excess of the usual dosage.

"POVERTY" OF SIDE EFFECTS

"The most striking aspect of thioridazine [Mellaril] therapy is the poverty of side effects.... In its lack of side effects and low toxicity, it is superior to all other tranquilizing drugs tested. For this reason also it is well tolerated by patients, particularly those who are not hospitalized and who frequently discontinue their medication because of dizziness, sleepiness, increased tension or parkinsonism with other drugs."[2]

NEGLIGIBLE SIDE EFFECTS

"Side effects were negligible at all dosage levels: no incidence of parkinsonism or other extrapyramidal symptoms. Minimal sedation, on the whole lower than with other tranquilizing agents. No alteration in liver function, urine or blood. No photosensitivity. Patient acceptability was exceptional: lack of drowsiness, lethargy or 'washed out' feeling, permitted patients to carry on normal everyday activities. Orthostatic hypotension was absent. The initial 'keyed up' tense feeling common to other drugs of this type was absent.... Patients forced to interrupt treatment with other phenothiazine derivatives because of parkinsonism or other extrapyramidal symptoms were able to continue therapy with thioridazine without appearance of parkinsonism."[3]

SINGULARLY FREE OF SIDE EFFECTS

"The extrapyramidal syndrome was not encountered in any of its forms. Dizziness and sleepiness responded to a reduction in dosage. Other side effects did not occur.... It is singularly free from the side effects ordinarily seen with these [phenothiazine] compounds."[4]

ABSENCE OF SIGNIFICANT SIDE EFFECTS

"None of the following toxic effects, so common after administration of the phenothiazines, was present during the period of Thioridazine administration: Parkinsonism or Parkinson-like symptoms, photosensitivity, orthostatic hypotension, bone-marrow depression."[1]

MINIMAL SIDE EFFECTS

"Side effects such as extrapyramidal activity, jaundice and photosensitivity have not been observed in patients treated with Thioridazine [Mellaril]. Extrapyramidal side effects produced by other phenothiazines have disappeared promptly with no deterioration in the behavioral response when these patients have been shifted to Thioridazine."[5]

NO JAUNDICE

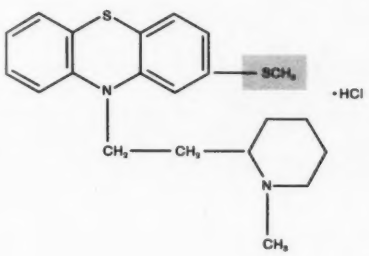
"No allergic reactions were observed such as skin eruptions, jaundice or agranulocytosis. Central nervous system toxicity, as manifested by extrapyramidal effects, seizures, and excitement did not occur despite the use of high doses (up to 2000 mg.) of the drug."[6]

Mellaril®

THIORIDAZINE HCl

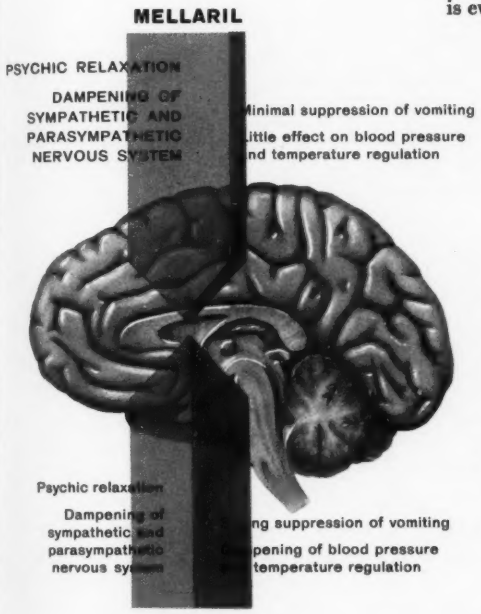
specific, effective tranquilizer • safer at all dosage levels

a new advance in tranquilization:
greater specificity of tranquilizing action plus fewer side effects



Of 109 phenothiazines synthesized by Sandoz, Mellaril was selected as the most promising on the basis of extensive evaluation. The presence of a thiomethyl radical ($S\text{-}CH_3$) in the position conventionally occupied by a halogen in other phenothiazines is unique and could be responsible for the relative absence of side effects and greater specificity of psychotherapeutic action. This is shown clinically by:

1 **A specificity of action on certain brain sites in contrast to the more generalized or "diffuse" action of other phenothiazines. This is evidenced by a lack of appreciable anti-emetic effect.**



other phenothiazine-type tranquilizers

2 **Less "spill-over" action to other brain areas — hence, absence of undue sedation, drowsiness or autonomic nervous system disturbances.**

3 **A notable absence of extrapyramidal stimulation.**

4 **Lack of impairment of patient's normal drive and energy, while achieving psychomotor control in mental and emotional disorders.**

5 **Virtual freedom from toxic effects — jaundice, photosensitivity, skin eruptions, disturbed body temperature regulation, blood forming disorders have been absent in reports currently available.**

These properties add up to a greater margin of safety in general office practice, in ambulatory psychiatric out-patient clinics, and in hospitalized patients.

Mellaril®

THIORIDAZINE, Sandoz

specific, effective tranquilizer • safer at all dosage levels

excellent clinical response

In office practice and in hospitalized patients, Mellaril has proved highly useful for a wide variety of major and minor emotional disorders (such as anxiety, tension, apprehension, alcoholism, agitated psychoneurosis, agitated psychotic states, etc.).

EXTREMELY SATISFACTORY "... produced extremely satisfactory results in the broad therapeutic range represented in this series."[3]

POTENT AGENT "... appears to be a potent agent in the symptomatic management of a variety of psychiatric states."[4]

MAJOR ADDITION TO THERAPEUTICS "This drug appears to represent a major addition to the safe and effective treatment of a wide range of psychological disturbances seen daily in the clinics or by the general practitioner."[1]

AN ACTIVE AGENT "Thioridazine is an active therapeutic agent. ... It is effective in a variety of psychiatric disorders, including schizophrenic reactions. ... The drug is particularly advantageous for a group of schizophrenic patients who are sometimes made worse by other phenothiazine derivatives or Rauwolfia alkaloids. It should also be suitable for treating patients with psychoneuroses and chronic brain syndrome."[6]

EVEN IN VERY SEVERE CASES "Of the 152 patients treated 25 have been released and they have not suffered a relapse. This proportion is significant if we stop to consider that we are dealing only with acute cases which had been considered hopeless and obviously destined to finish their days in an asylum."[7]

EXCELLENT THERAPEUTIC RESPONSE "Patients with emotional tensions resulting from the stress and strain of life ... were treated with Mellaril at the dosage level of 10 mg. three times daily. In 94 such patients, 83 obtained an excellent therapeutic response."[8]

Mellaril®

THIORIDAZINE HCl

specific, effective tranquilizer • safer at all dosage levels

"...extremely satisfactory results..." in a clinical spectrum ranging from minor nervous disorders to severe psychotic disturbances[3]

RESULTS WITH MELLARIL IN 194 PATIENTS[3]

ACUTE PSYCHOTICS	CHRONIC PSYCHOTICS	NEUROTICS
83% satisfactory effect	68% satisfactory effect	57% satisfactory effect
Some cases had complete remission of symptoms. Most were able to return home to useful occupations.	Relief of symptoms in cases permitted easier management and a return to a more or less useful life.	Some cases, complete relief of symptoms. Other cases, partial relief of symptoms.

RESULTS WITH MELLARIL IN PATIENTS PREVIOUSLY TREATED WITH OTHER TRANQUILIZERS[3]

DIAGNOSTIC CATEGORY	IMPROVED %	VERY SATISFACTORY %	SATISFACTORY %	UNSATISFACTORY %
SCHIZOPHRENIA				
Acute	89	61	28	11
Chronic paranoid	84.2	31.6	52.6	15.8
Chronic, other	73.9	21.7	52.2	26.1
Residual	57.1	9.5	47.6	42.9
CHRONIC BRAIN SYNDROME	66.6	33.3	33.3	33.3
CHRONIC PSYCHONEUROSIS	62.5	12.5	50	37.5
CHRONIC PSYCHOSOMATIC DISORDERS	75	25	50	25

Mellaril®

THIORIDAZINE HCl

specific, effective tranquilizer • safer at all dosage levels

a guide to administration and dosage

Dosage ranges from 10 mg. three or four times a day in milder situations to 25 mg. three or four times a day for more disturbed patients. In ambulatory psychiatric out-patients, dosages of 50 to 100 mg. three or four times a day have been found adequate. For severely disturbed hospitalized psychotics, dosages of 200 to [illegible] mg. three times a day may be administered.

Dosage must be individualized according to the co[illegible]tion and degree of response. In all cases, the small[illegible] effective dosage should be determined for each pati[illegible]

INDICATION	USUAL STARTING DOSE	TOTAL DAILY DOSAGE RANGE
ADULTS		
Mental and Emotional Disturbances:		
MILD—where anxiety, apprehension and tension are present	10 mg. t.i.d.	20-60 mg.
MODERATE—where agitation exists in psychoneurosis, alcoholism, intractable pain, senility, etc.	25 mg. t.i.d.	50-200 mg.
SEVERE—in agitated psychotic states as schizophrenia, manic depressive, toxic psychoses, etc.:		
Ambulatory	100 mg. t.i.d.	200-400 mg.
Hospitalized	100 mg. t.i.d.	200-800 mg.
CHILDREN		
BEHAVIOR PROBLEMS IN CHILDREN	10 mg. t.i.d.	20-40 mg.

PRECAUTIONS: Although possessing a unique structure and a selectivity of action which broadens its therapeutic ratio, the physician should be alert to the possibility of untoward reactions in certain susceptible individuals. In particular, he should watch for potential hemopoiet[illegible] depression, jaundice or orthostatic hypotension. As wi[illegible] other phenothiazines, Mellaril is contraindicated i[illegible] severely depressed or comatose states from any cause.

SUPPLIED: MELLARIL Tablets, 10 mg., 25 mg., 100 mg. Bottles of 100.

1. Ostfeld, A. M.: Scientific Exhibit, American Academy of General Practice, San Francisco, April 6-9, 1959. 2. Kinross-Wright, V. J.: Lecture, Clini[illegible] Meeting, American Medical Association, Minneapolis, Dec. 4, 1958. 3. Kinross-Wright, V. J.: Scientific Exhibit, Clinical Meeting, American Medical Asso[illegible] ation, Minneapolis, Dec. 2-5, 1958. 4. Cohen, S.: TP-21, a new phenothiazine, Am. J. Psychiat. *115*:358, Oct. 1958. 5. Glueck, B.: Scientific Exhibit, Americ[illegible] Psychiatric Association, Philadelphia, April 27-May 1, 1959. 6. Hollister, L. E., and Macdonald, B. F.: Presented at California Medical Association; Section o[illegible] Psychiatry, San Francisco, Feb. 25, 1959. 7. Remy, M.: Schweiz. med. Wchnschr. *88*:1221, Nov. 29, 1958. 8. Freed, S. C., in discussion on Thioridazine (Mellari[illegible] in Psychiatric Patients, Hollister, L. E., and Macdonald, B. F., presented at California Medical Association; Section on Psychiatry, San Francisco, Feb. 25, 195[illegible]

- controls neurotic and psychotic patients with anxiety, apprehension, nervous tension
- virtual absence of jaundice, parkinsonism, photosensitivity, dermatitis
- minimal sedation and drowsiness
- does not mask organic conditions such as brain tumors, intestinal obstruction, etc., because of lack of anti-emetic action
- increased specificity of action results in greater safety at all dosage levels

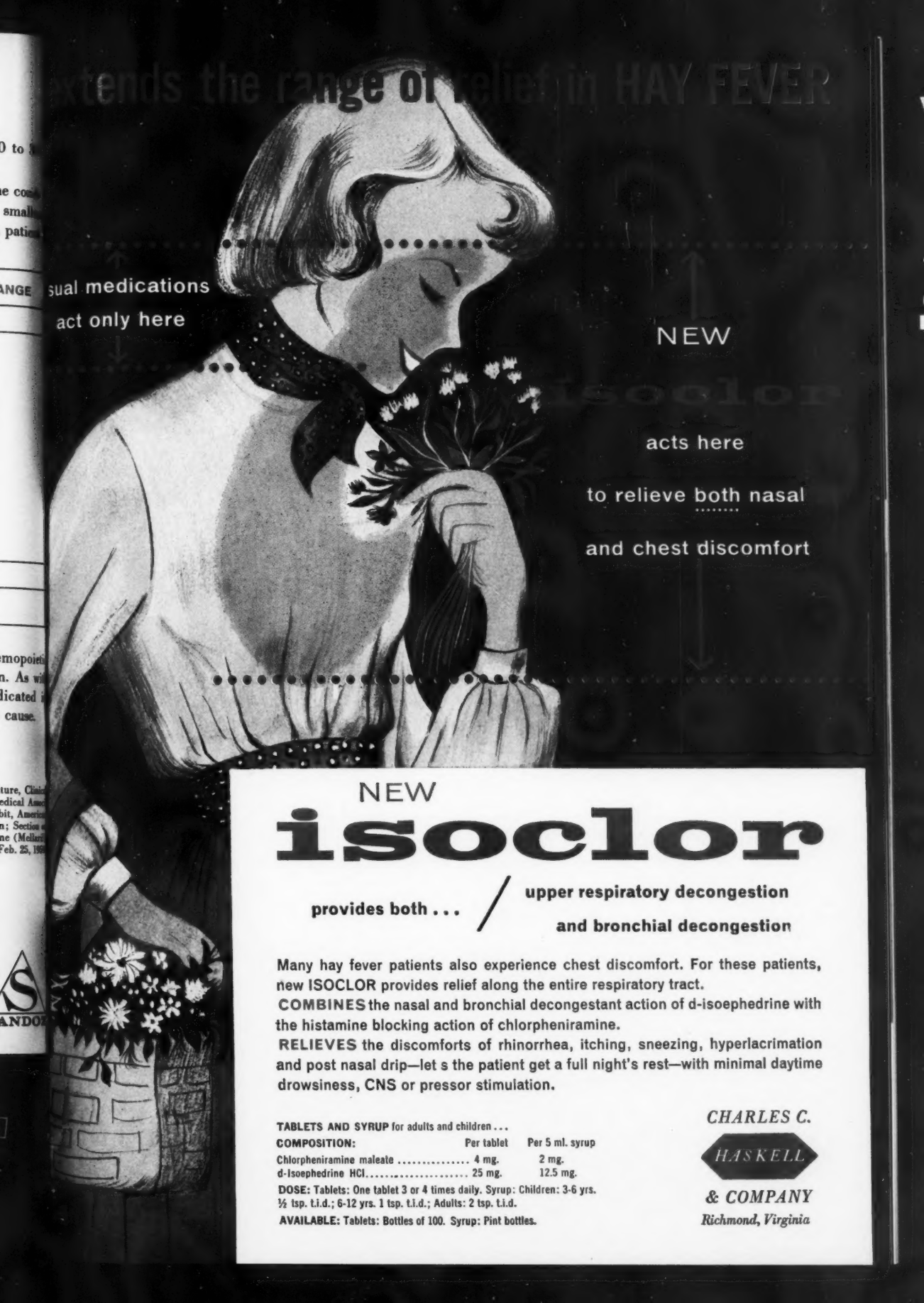
SANDO[illegible]

Mellaril®

THIORIDAZINE

specific, effective tranquilizer • safer at all dosage levels

tranquilization | anti-emesis



NEW

isoclor

provides both . . . / upper respiratory decongestion and bronchial decongestion

Many hay fever patients also experience chest discomfort. For these patients, new ISOCLOR provides relief along the entire respiratory tract.

COMBINES the nasal and bronchial decongestant action of d-isoephedrine with the histamine blocking action of chlorpheniramine.

RELIEVES the discomforts of rhinorrhea, itching, sneezing, hyperlacrimation and post nasal drip—let s the patient get a full night's rest—with minimal daytime drowsiness, CNS or pressor stimulation.

TABLETS AND SYRUP for adults and children . . .

COMPOSITION:	Per tablet	Per 5 ml. syrup
Chlorpheniramine maleate	4 mg.	2 mg.
d-Isoephedrine HCl	25 mg.	12.5 mg.

DOSE: Tablets: One tablet 3 or 4 times daily. Syrup: Children: 3-6 yrs. ½ tsp. t.i.d.; 6-12 yrs. 1 tsp. t.i.d.; Adults: 2 tsp. t.i.d.

AVAILABLE: Tablets: Bottles of 100. Syrup: Pint bottles.

CHARLES C.
HASKELL
& COMPANY
Richmond, Virginia

in vaginitis

IMPROVED

TRICOFURON®

destroys all **3** *principal pathogens*

Whether vaginitis is caused by Trichomonas, Monilia or Hemophilus vaginalis—alone or combined—TRICOFURON IMPROVED swiftly relieves symptoms and malodor, and achieves a truly high percentage of cultural cures, frequently in 1 menstrual cycle. TRICOFURON IMPROVED provides: a *new* specific moniliacide MICOFUR® brand of nifuroxime, the *established* specific trichomonacide FUROXONE® brand of furazolidone and the *combined* actions of both against Hemophilus vaginalis.

1. *Office* insufflation once weekly of the Powder (MICOFUR [*anti*-5-nitro-2-furaldoxime] 0.5% and FUROXONE 0.1% in an acidic water-soluble powder base). **2.** Continued *home* use twice daily, with the Suppositories (MICOFUR 0.375% and FUROXONE 0.25% in a water-miscible base).

[redacted]

NITROFURANS—a *new* class of antimicrobials—neither antibiotics nor sulfonamides.

EATON LABORATORIES, NORWICH, NEW YORK

- *Prompt remission of symptoms*
- *Bleeding and frequency of stools sharply reduced*
- *Healing of rectal mucosa within a month in most cases*
- *Can be given safely over long periods of time*

Azulfidine®

BRAND OF SALICYLAZOSULFAPYRIDINE

the most valuable drug in the treatment of

Ulcerative Colitis

"The most widely accepted sulfonamide preparation today for the therapy of chronic ulcerative colitis is salicylazosulfapyridine (Azulfidine)."

Hightower, N.C., Jr., and others: Am. J. Digest. Dis. 3:931 (Dec.) 1958

Also valuable in treatment of regional enteritis and other forms of colitis

Pharmacia Laboratories, Inc.
New York City.

COVER THE
SUMMER FRONT...
WITH THREE
HIGHLY EFFECTIVE
CORTICOSTEROID
TOPICALS

INFLAMMATORY AND ALLERGIC SKIN CONDITIONS

Aristocort® *CREAM*

Triamcinolone Acetonide 0.1%
TUBES OF 5 GM. AND 15 GM.

Aristocort® *OINTMENT*

Triamcinolone Acetonide 0.1%
TUBES OF 5 GM. AND 15 GM.

INFLAMMATORY, ALLERGIC, INFECTIVE EYE AND EAR CONDITIONS

Neo-Aristocort®

Neomycin-Triamcinolone Acetonide 0.1%
TUBES OF ⅛ OZ.

EYE-EAR OINTMENT

Each...sparingly applied...offers the unique efficacy of ARISTOCORT in topical situations...with 10-fold the potency of hydrocortisone topically yet *without* the hazards associated with systemic absorption

Lederle

LEDERLE LABORATORIES, A Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

In response to innumerable requests from dermatologists

Winthrop Laboratories now makes available

TRIQUIN®

FOR LUPUS ERYTHEMATOSUS AND LIGHT-SENSITIVITY ERUPTIONS

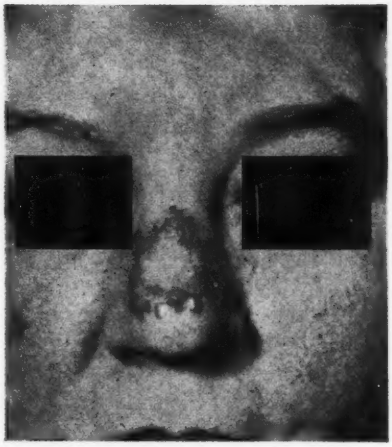
WHAT IT IS:
A combination of Atabrine® hydrochloride 25 mg., Aralen® phosphate 65 mg. and Plaquenil® sulfate 50 mg.

WHAT IT'S FOR:
Treatment of lupus erythematosus (chronic discoid type) and polymorphic light eruptions (light-sensitivity eruptions, solar urticaria or dermatitis).

HOW IT ACTS:
Each of the three components produces beneficial response in lupus erythematosus and light-sensitivity eruptions. Since the dose of each of the Triquin components is very low, overall toxicity is reduced and clinical tolerance improved. Furthermore, the three components appear to act synergistically.

HOW SUPPLIED:
Triquin tablets in bottles of 100, sold on prescription only.

Write for TRIQUIN booklet.



DOSAGE:
Lupus. Average initial adult dose, 1 or 2 tablets after meals and at bedtime. Dosage should be reduced gradually at two week intervals to 1 or 2 daily.

Light-Sensitivity Eruptions. Average initial adult dose, 1 tablet after breakfast and lunch. May be reduced after several weeks to maintenance dosage of 1 tablet daily.

Triquin, Atabrine (brand of quinacrine), Aralen (brand of chloroquine), and Plaquenil (brand of hydroxychloroquine), trademarks reg. U.S. Pat. Off.

Winthrop LABORATORIES New York 18, N. Y.

control

runaway diarrheas.

Donnagel®

Robins

or Donnagel® with Neomycin

Prompt and more dependable control of virtually all diarrheas can be achieved with the comprehensive DONNAGEL formula, which provides adsorbent, demulcent, antispasmodic and sedative effects—with or without an antibiotic. Early re-establishment of normal bowel function is assured—for all ages, in all seasons.

DONNAGEL: In each 30 cc. (1 fl. oz.):

Kaolin (90 gr.)	6.0 Gm.
Pectin (2 gr.)	142.8 mg.
Hyoscyamine sulfate	0.1037 mg.
Atropine sulfate	0.0194 mg.
Hyoscine hydrobromide	0.0065 mg.
Phenobarbital (¼ gr.)	16.2 mg.

DONNAGEL WITH NEOMYCIN

Same formula, plus

Neomycin sulfate	300 mg.

(Equal to neomycin base, 210 mg.)

A. H. ROBINS CO., INC., Richmond 20, Virginia · *Ethical Pharmaceuticals of Merit since 1878*

†surveyor, to non-engineers

he won't be mired for long once he's on

PARAFON*

PARAFLEX® + TYLENOL®

for muscle relaxation *plus* analgesia

prescribe PARAFON in low back pain—sprains—strains—rheumatic pains

Each PARAFON tablet contains:
PARAFLEX® Chlorzoxazone‡ . . 125 mg.
Specific for skeletal muscle spasm
TYLENOL® Acetaminophen . . . 300 mg.
The analgesic preferred in musculoskeletal pain

Supplied: Tablets, scored, pink, bottles of 50.

Dosage: Two tablets three or four times a day.

and in arthritis

PARAFON* with Prednisolone

Each PARAFON WITH PREDNISOLONE tablet contains: PARAFLEX® Chlorzoxazone‡ 125 mg., TYLENOL® Acetaminophen 300 mg., and prednisolone 1.0 mg.

Supplied: Tablets, scored, buff colored, bottles of 36.

Dosage: One to two tablets three or four times a day.

Precautions: The precautions and contraindications that apply to all steroids should be kept in mind when prescribing PARAFON WITH PREDNISOLONE.

*Trade-mark ‡U.S. Patent Pending

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McNeil Laboratories, Inc • Philadelphia 32, Pa.

more diabetic patients enjoy comfort, convenience better regulation with effective oral

DBI

the only "full-range" oral hypoglycemic agent

for most of your diabetic patients

DBI

(brand of Phenformin)

the full-range oral hypoglycemic agent... lowers blood sugar in mild, moderate, and severe diabetes, in children and adults

FOR MORE DEPENDABLE RESPONSE, start your patients on DBI—entirely different from the sulfonylureas in chemical structure, mode of action and spectrum of activity... usually effective in low dosage range (50 to 150 mg. per day).

3 out of every 4 stable adult diabetics are satisfactorily and comfortably regulated with DBI.

2 out of every 3 brittle diabetics (juvenile or adult) enjoy better stabilization and easier management with combination of DBI and injected insulin. The smooth, gradual onset of blood-sugar lowering action helps prevent dangerous shifts between hypoglycemic reactions and hyperglycemic ketoacidosis.

sulfonylurea failures—secondary failures and primary resistant patients may respond well to DBI alone, or combined with a sulfonylurea.

no clinical toxicity in over 3000 patients studied for varying periods up to nearly three years.

On a "start-low-go-slow" dosage pattern, DBI is relatively well tolerated. Gastrointestinal reactions occur most frequently in dosages exceeding the practical maximum 150 mg. daily, but abate promptly upon reduction of dosage or withdrawal of DBI.

The physician prescribing DBI should be thoroughly familiar with its indications, dosage, possible side effects, precautions and contraindications, etc.

DBI (N^1-β-phenethylbiguanide HCl) is available as white, scored tablets of 25 mg. each, bottle of 100.

Write for detailed literature.

an original development from the research laboratories of

U. S. vitamin & pharmaceutical corporation

Arlington-Funk Laboratories, division
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for most of your diabetic patients

DBI

(brand of Phenformin)

the full-range oral hypoglycemic agent... lowers blood sugar in mild, moderate, and severe diabetes, in children and adults

FOR MORE DEPENDABLE RESPONSE, start your patients on DBI—entirely different from the sulfonylureas in chemical structure, mode of action and spectrum of activity... usually effective in low dosage range (50 to 150 mg. per day).

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DBI (N^1-β-phenethylbiguanide HCl) is available as white, scored tablets of 25 mg. each, bottle of 100.

Write for detailed literature.

an original development from the research laboratories of

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APPLICATION FOR HOTEL ACCOMMODATIONS

53rd ANNUAL MEETING

Atlanta, Georgia

November 16, 17, 18, and 19, 1959

Please Complete this Application and forwrd to Atlanta Address Now!

A Housing Bureau has been established for your convenience in making hotel reservations in Atlanta for the forthcoming meeting of the Southern Medical Association. Comparable room rates are listed. *Use the Reservation Blank below.* Please specify your first, second and third choice hotel. All requests for reservations should give: (1) anticipated date and hour of arrival; (2) date and approximate hour of departure; and (3) names and addresses of all persons who will occupy the accommodations. ALL RESERVATIONS SHOULD BE CLEARED THROUGH THE HOUSING BUREAU. Since all requests for rooms will be handled in chronological order, you should mail your application as early as possible. All reservations will be confirmed. The Municipal Auditorium will be General Headquarters.

Hotel	Single	Double Bed	Twin Beds	Suite
Atlanta Biltmore	$ 8.00–12.00	$10.00–16.00	$12.00–16.00	$25.00–75.00
Atlantan	5.00– 7.50	7.00– 9.50	9.00–12.00	18.00–20.00
Briarcliff	6.00–10.00	10.00–14.00	12.00–16.00	18.00–30.00
Clermont	4.00– 5.50	6.00– 7.50	7.00– 7.50	10.00–15.00
Cox Carlton	5.50– 6.50	8.00– 9.00	8.00– 9.00	16.00–18.00
Dinkler Plaza	7.00–12.50	10.00–12.50	14.00–16.50	36.50–56.50
Georgia	5.00 8.00	7.00–12.00	8.50–12.00	18.00–25.00
Georgian Terrace	6.00– 8.00	8.00–10.00	8.50–12.00	12.00–30.00
Henry Grady	7.00–14.00	10.00–16.00	11.00–16.00	20.00–35.00
Peachtree Manor	6.00– 8.00	8.50–12.00	8.50–12.00	14.00–32.00
Peachtree on Peachtree	6.00– 7.00	8.50–10.50	9.50–11.50	16.00–26.00
Piedmont	6.00– 9.00	9.50–11.00	10.00–15.00	25.00–30.00
Motels				
Atlanta Cabana	10.00–14.00	13.00–15.00	15.00–16.00	32.00
Heart of Atlanta	9.00	12.00	13.00–14.00	24.00–26.00
The Riviera	Rates Unannounced (To open April, 1959)			
Downtown Motel	9.00–11.00		11.00–14.00	

HOUSING BUREAU
SOUTHERN MEDICAL ASSOCIATION
720 Rhodes-Haverty Building
Atlanta 3, Georgia

Please reserve the following accommodations for me for the Southern Medical Association Meeting:

Hotel Preference	Kind of Accommodations Desired
1st Choice.....	.....Single room at $.....to $.....
2nd Choice.....	.....Double room at $.....to $.....
3rd Choice.....	.....Twin bedroom at $.....to $.....
	.....Other type.....
Arrival Date.....	.....hour.....a.m.....p.m.
Departure Date.....	.....hour.....a.m.....p.m.

THE NAME OF EACH HOTEL GUEST MUST BE LISTED. Include the names of all persons for whom you are requesting reservations and who will occupy the room (s):

Name of Occupant (s) (Please type or print)	Address
.....	.....
.....	.....
.....	.....

Individual Requesting Reservations
(Please type or print)

Name.....

Address.....

City.....Zone.....

State.....

If the hotels of your choice are unable to accept your reservation, the Housing Bureau will make as good a reservation as possible elsewhere.

Paradox of the scalp-scratcher: Why will he scratch here?

Sad but true: the one man who can help him is the last man he'll ask—you. (Dandruff a *disease?*) Result: he goes right on scratching and hoping . . . and looking and scratching. You can end his search and gain his lasting appreciation, with a little medical advice—and a prescription for Selsun. Abbott

SELSUN®
(Selenium Sulfide, Abbott)

an ethical answer to a medical problem

anemia of pregnancy, **another indication**

for Iberol® (filmtab®): potent antianemia therapy

plus the complete B-complex

JUST 2 IBEROL FILMTABS A DAY SUPPLY

The Right Amount of Iron

Ferrous Sulfate, U.S.P.	1.05 Gm.
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Plus the Complete B Complex

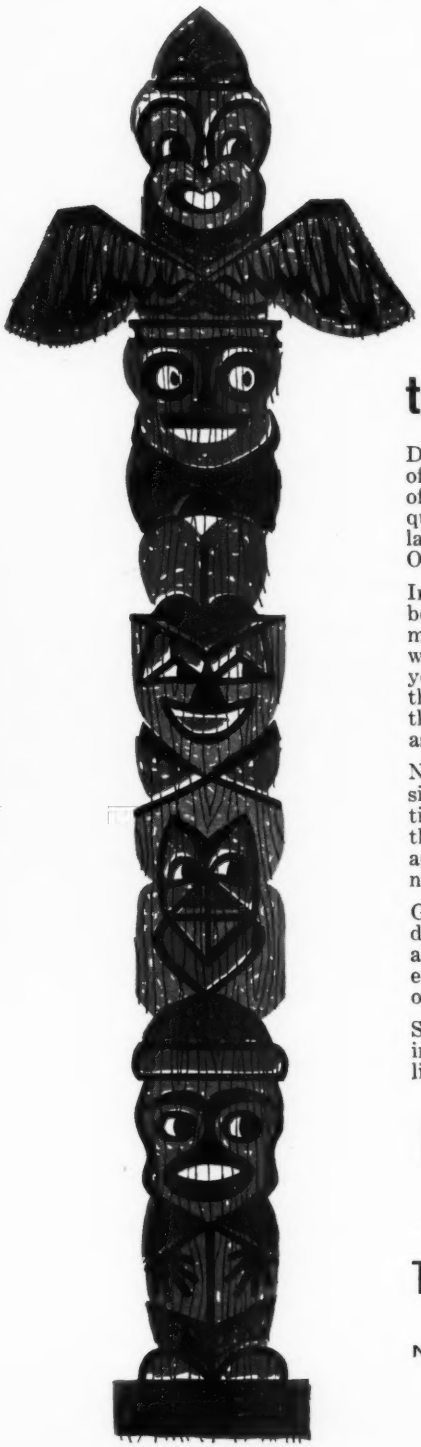
Vitamin B_{12} with Intrinsic Factor Concentrate	1 U.S.P. Unit (Oral)
Folic Acid	2 mg.
Liver Fraction 2, N.F.	200 mg.
Thiamine Mononitrate	6 mg.
Riboflavin	6 mg.
Nicotinamide	30 mg.
Pyridoxine Hydrochloride	3 mg.
Calcium Pantothenate	6 mg.

Plus Vitamin C

Ascorbic Acid	150 mg.

®FILMTAB—FILM-SEALED TABLETS, ABBOTT, U.S. PAT. NO. 2,881,085. © 1959, ABBOTT LABORATORIES 907020

Abbott



the disease of many masks

Doctor, do you recognize this patient? She complains of flatulence, constipation with alternating periods of diarrhea, and colicky pains in the lower right quadrant. At other times she is troubled by anorexia, lassitude, dull headache, muscle pains and backache. Or she may have only one or two of these symptoms.

In these puzzling cases, serious consideration should be given to intestinal amebiasis—the disease of many masks. Clinicians say it is "one of the most widespread and serious protozoan diseases of man," yet "there is no parasite more often misdiagnosed than is *E. histolytica*." Conservative estimates place the incidence at 10% of the United States population as a whole, and 16% in southern states.

Now Glarubin, a relatively non-toxic amebicide, simplifies the treatment of suspected cases of intestinal amebiasis. Glarubin, a crystalline glycoside from the fruit of *Simarouba glauca*, is a specific amebicidal agent with minimal side effects. It contains no arsenic, bismuth or iodine.

Glarubin is administered orally in tablet form and does not require strict medical supervision or hospitalization. Extensive clinical trials prove it highly effective in intestinal amebiasis, and virtually free of toxicity.

Supplied in bottles of 40 tablets, each tablet containing 50 mg. of glaucarubin. Write for descriptive literature, bibliography, and dosage schedules.

new Glarubin

TABLETS

specific for intestinal amebiasis

THE S. E. MASSENGILL COMPANY

BRISTOL, TENNESSEE

NEW YORK • KANSAS CITY • SAN FRANCISCO

"... which antacid? Rorer's Maalox. Excellent results, no constipation plus a pleasant taste that patients like."

MAALOX® an efficient antacid suspension of magnesium-aluminum hydroxide gel offered in bottles of 12 fluidounces.

TABLET MAALOX: 0.4 Gram (equivalent to one teaspoonful), Bottles of 100.

TABLET MAALOX NO. 2: 0.8 Gram, double strength (equivalent to two teaspoonfuls), Bottles of 50 and 250.

Samples on request.

WILLIAM H. RORER, INC., Philadelphia 44, Pennsylvania

Fostex®
treats their acne while they wash

degreases the skin helps remove blackheads dries and peels the skin

...and this is how it works

Fostex provides essential actions necessary in treating acne. It washes off excess oil. It unblocks pores by penetrating and softening blackheads. It dries and peels the skin, removing papule coverings, thus permitting drainage of sebaceous glands.

Fostex contains Sebulytic®,* a combination of surface-active wetting agents with remarkable antiseborrheic, keratolytic and antibacterial actions . . . enhanced by sulfur 2%, salicylic acid 2%, hexachlorophene 1%.

*sodium lauryl sulfoacetate, sodium alkyl aryl polyether sulfonate and sodium dioctyl sulfosuccinate.

Your patients will like Fostex because it is so simple to use. They simply wash acne skin 2 to 4 times a day with Fostex, instead of using soap.

FOSTEX CREAM . . . in 4.5 oz. jars. For therapeutic washing in the initial phase of oily acne treatment.

FOSTEX CAKE . . . in bar form. For therapeutic washing to keep the skin dry and free of blackheads during maintenance therapy. Also used in relatively less oily acne.

Write for samples.

WESTWOOD PHARMACEUTICALS Buffalo 13, New York

AN AMES CLINIQUICK™

CLINICAL BRIEFS FROM MODERN PRACTICE

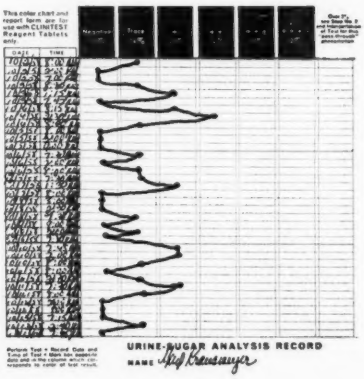
What differentiates "renal diabetes" (renal glycosuria) from diabetes mellitus?

Blood sugar levels. In renal glycosuria they are normal; in untreated diabetes, fasting blood sugars are usually 130 mg.% or over and postprandial levels 170 mg.%, or more.

Source: Joslin, E. P.; Root, H. F.; White, P., and Marble, A.: The Treatment of Diabetes Mellitus, ed. 9, Philadelphia, Lea & Febiger, 1952, pp. 701-702.

A "URINE-SUGAR PROFILE" FOR CLOSER CONTROL

The new CLINITEST Urine-Sugar Analysis Set contains an improved Analysis Record form that enables even closer control of the *moderate* and the *severe* diabetic. Daily urine-sugar readings may be connected to produce a graph—a day-to-day "profile" that reveals at a glance individual trends and degree of control.



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CLINITEST®

BRAND

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FOR EVEN BETTER CONTROL OF THE MODERATE AND THE SEVERE DIABETIC

the STANDARDIZED urine-sugar test for reliable quantitative estimations "...the most satisfactory method for home and office routine testing."*

*GP *16*:121 (August) 1957.

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COMPANY, INC
Elkhart • Indiana
Toronto • Canada

If one . . . or all . . . needs nutritional support . . .

they
deserve

GEVRAL®

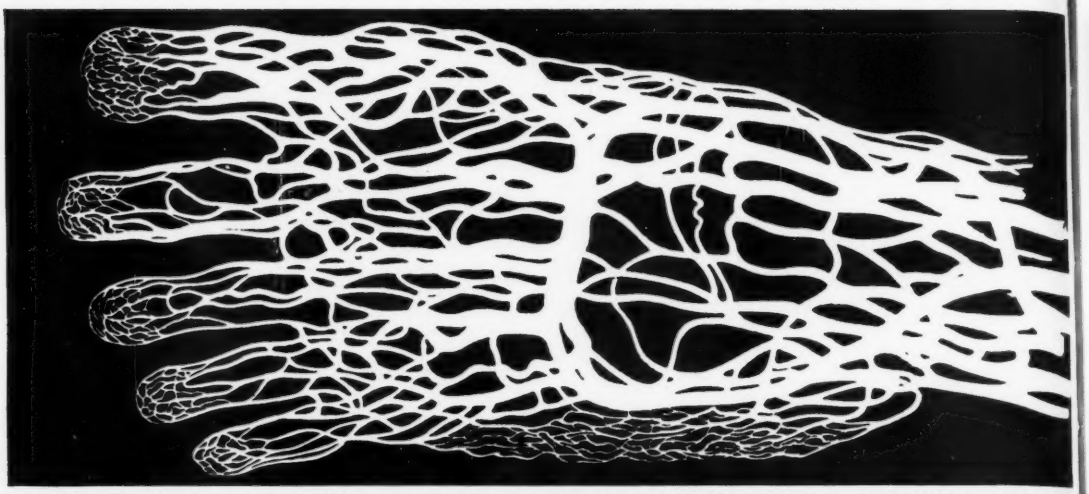
capsules—14 VITAMINS AND 11 MINERALS

Vitamin-Mineral Supplement Lederle

For Complete Formula see PDR (Physicians' Desk Reference), page 689

LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

Lederle



WHEN YOUR PATIENT NEEDS BETTER PERIPHERAL CIRCULATION

PRESCRIBE SAFE, FAST-ACTING, VERSATILE VASTRAN®

Vastran more naturally relaxes constricted peripheral blood vessels, brings immediate and reassuring relief of ischemia. Essential cofactors help correct secondary metabolic impairment. Unlike sympatholytic agents, Vastran is completely safe; as much as 10 times the usual dosage may be given without serious side effects; and Vastran therapy costs less than sympatholytic vasodilators. **INDICATIONS:** Cold hands and feet; mild and moderately severe cases of peripheral vascular disease such as thromboangiitis, chronic chilblains and the less advanced cases of Raynaud's disease; control of migraine and vertigo; adjunctive therapy in musculoskeletal inflammation and spasm. Each Vastran® tablet contains: nicotinic acid, 50 mg.; ascorbic acid, 100 mg.; riboflavin, 5 mg.; thiamine mononitrate, 10 mg.; pyridoxine hydrochloride, 1 mg.; cobalamin (vitamin B_{12} activity), 2 mcg.; calcium pantothenate, 5 mg. **USUAL DOSAGE:** 1 tablet q.i.d., before meals. FOR INITIAL THERAPY IN ACUTE AND SEVERE CONDITIONS/INJECTABLE VASTRAN AMP SOLUTION. / Rapid vasodilation COMPLEMENTED BY ADENOSINE MONOPHOSPHATE to help restore muscle function by increasing biochemical energy stores. Each cc. contains adenosine 5-monophosphate, 25 mg.; Nicotinic Acid, 20 mg.; Vitamin B_{12}, 75 mcg.

For further information & professional samples write to:

WAMPOLE LABORATORIES
STAMFORD, CONNECTICUT

VASTRAN

when it's skin deep

use XYLOCAINE *ointment*

. . . in nearly all external symptoms of *pain, itching* and *burning*, e.g., sunburn, minor burns, insect bites, abrasions, poison ivy and other contact dermatitis, hemorrhoids and inoperable anorectal conditions, and cracked nipples.

Xylocaine Ointment, a surface or topical anesthetic, gives fast, effective and long lasting relief. Its *water-soluble, nonstaining* base melts on contact with the skin, to assure immediate release of the anesthetic for fast action and it does not interfere with the healing processes.

ASTRA PHARMACEUTICAL PRODUCTS, INC., WORCESTER 6, MASS., U.S.A.

XYLOCAINE® OINTMENT

(brand of lidocaine*)

2.5% & 5%

SURFACE ANESTHETIC

SEE PDR

*U.S. Pat. No. 2,441,498 Made in U.S.A.

LACTINEX®

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LACTINEX® *TABLETS & GRANULES*

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FOR RESTORING AND STABILIZING THE INTESTINAL FLORA

LACTINEX GRANULES and TABLETS contain a standardized viable mixed culture of Lactobacilli acidophilus and bulgaricus with the naturally-occurring metabolic enzymes produced by these organisms.

LACTINEX TABLETS—A clinically proven treatment for gastro-intestinal disturbances, including diarrhea[1, 2, 3], (antibiotic induced and others) in infants and adults.

LACTINEX GRANULES—An especially designed dosage form (served on cereal, food or with milk) of this effective product for the pediatric and geriatric patient.

Dosage: Three or four tablets or one packet, three or four times a day.

Supplied—tablets in bottles of fifty—granules in boxes of twelve, one gram packets.

1. Siver, Robert H.: Current Medical Digest, Vol. XXI, No. 9, September 1954.
2. McGivney, John: Texas State Journal of Medicine, Vol. 51, No. 1, January 1955.
3. Frykman, Howard M.: Minnesota Medicine, Vol. 38, No. 1, January 1955.

HYNSON, WESTCOTT & DUNNING, INC.

H&D **Baltimore 1, Maryland**

Remarkable relief from

LOW BACK PAIN

and

DYSMENORRHEA

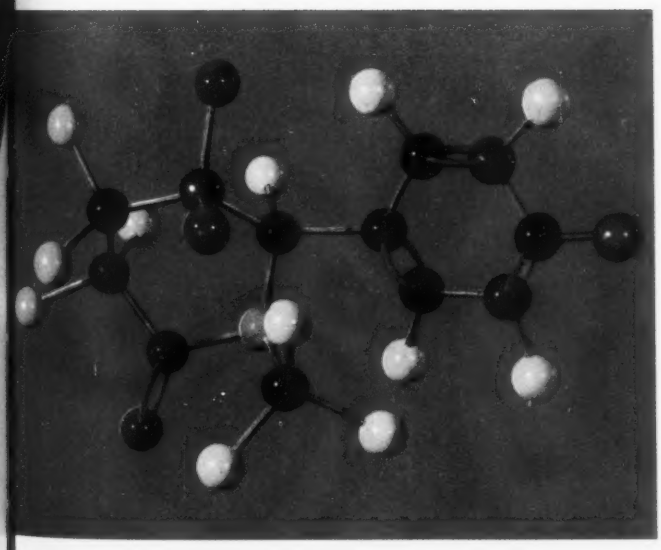
Trancopal®

*the first true tranquilaxant**

***Potent* MUSCLE RELAXANT**

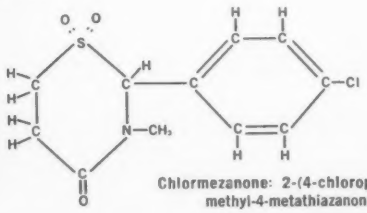
***... Equally effective as a* TRANQUILIZER**

***tran-qui-lax-ant** (tran'kwi-lak'sant) [< L. tranquillus, quiet; L. laxare, to loosen, as the muscles]



Trancopal, a major development of Winthrop research, is a new, orally administered non-hypnotic central relaxant and tranquilizer. It relieves muscle spasm in a variety of musculoskeletal and neurologic conditions and also exerts a marked tranquilizing effect in anxiety and tension states.

Unrelated chemically to any other drug in current use, Trancopal offers a completely new major chemical contribution to therapeutics.



Chlormezanone: 2-(4-chlorophenyl)-3-methyl-4-metathiazanone-1-dioxide

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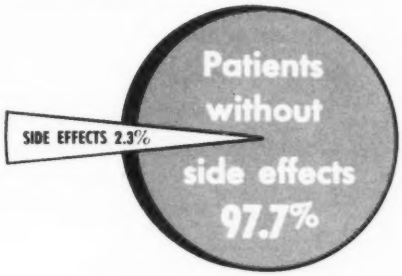

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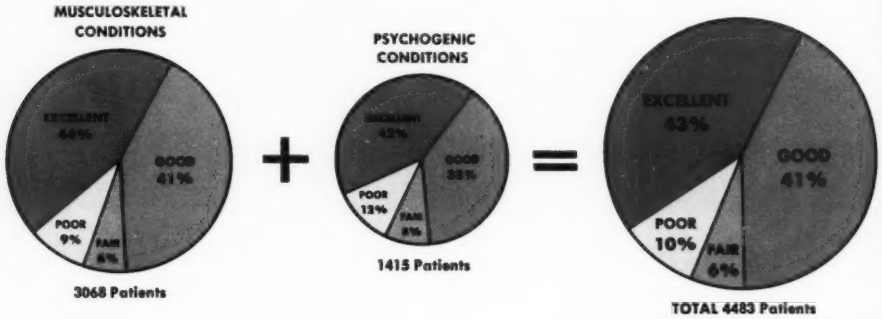

INDICATIONS

Musculoskeletal

- Low back pain (lumbago)
- Neck pain (torticollis, etc.)
- Bursitis
- Rheumatoid arthritis
- Osteoarthritis
- Disk syndrome
- Fibrositis
- Ankle sprain, tennis elbow, etc.
- Myositis
- Postoperative muscle spasm

Psychogenic

- Anxiety and tension states
- Dysmenorrhea
- Premenstrual tension
- Asthma
- Angina pectoris
- Alcoholism

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References: 1. Collective Study, Department of Medical Research, Winthrop Laboratories. • 2. Ganz, S.E: J. Indiana M. A. In press. • 3. Lichtman, A.L.: Kentucky Acad. Gen. Pract. J. 4:28, Oct., 1958.

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Lipoma of the Colon: With Report of Seven Cases*

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Emory University, Ga.

Lipoma of the colon is a relatively rare lesion. However, it has certain radiographic characteristics. Spontaneous sloughing of a pedunculated lipoma may permit its passage on defecation. Intussusception may be caused by this tumor..

Introduction

ALTHOUGH RELATIVELY RARE lipoma is the second most frequent benign tumor occurring in the colon. Until 1949 there had been reported only 172 cases of lipoma of the colon. However, since then several small series have appeared in the literature; the last being that of Henderson, Harris and Packer[1] in which 5 additional cases were reported. At the present time there are more than 200 case reports of this condition in the literature.[2-5]

Since 1949, 7 patients with lipoma of the colon have been seen at Emory University Hospital. In this small group most of the symptoms, complications, and radiographic findings have been encountered which occur with this condition.

Although lipomas may be found anywhere in the gastrointestinal tract, they occur most commonly in the colon.[6] They are most often solitary tumors, usually submucosal, but may be subserosal. Cases have been reported in which they were situated intramuscularly and intermuscularly. They may be pedunculated or sessile. None have been known to undergo malignant degeneration.[7-9]

It is reported that approximately one-half of the lipomas of the colon occur in the cecum and ascending colon.[1,10,11] It is interesting to note that in the 7 cases reported here, none were located in the cecum or ascending colon, rather they were situated in the distal half of the colon. Three were located in the descending colon, 2 in the sigmoid colon, one at the junction of the descending and sigmoid colon and one in the distal end of the transverse colon near the splenic flexure.

Symptomatology

Although symptoms may be vague and nonspecific, they have been reported to be present in 80 to 85% of cases. Constipation is the most frequent complaint. Pain in the lower abdomen, which is intermittent in character and often relieved by the passage of flatus or a bowel movement, is an occasional complaint.[12] Alternating diarrhea and constipation have been present in a few cases. Intussusception, intestinal obstruction, and ulceration with bleeding, are not infrequent complications.[13] These tumors may on occasion be expelled spontaneously.

Radiographic Findings

Until recently lipoma of the colon was rarely diagnosed preoperatively. In the recent report of Henderson, Harris, and Packer,[1] the diagnosis was suggested preoperatively in 3 of 5 cases because of the radiographic findings.

The radiographic characteristic which makes a lipoma identifiable as such in any location of the body is its relative radiolucency as compared to other soft tissues be-

*Read before the Section on Radiology, Southern Medical Association, Fifty-Second Annual Meeting, New Orleans, La., November 3-6, 1958.

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cause of its fat content. However, lipomas of the colon are usually not identifiable on plain films of the abdomen because of the thickness of surrounding tissues which have to be penetrated. Exceptions have been reported.[14] On air-contrast studies they frequently appear more radiolucent than one would expect with a tumor of their size, but this finding varies with technic and is not completely reliable.

Lipomas characteristically appear as rounded or ovoid radiolucent filling defects with smooth margins on barium enema or air-contrast studies of the colon. There is no evidence of invasion of the bowel wall although there may be dimpling of the bowel wall at the site of attachment of the lipoma. These tumors are often pedunculated and may show a tendency to slight lobulation. Even if slight lobulation is present, the tumors usually have a strikingly smooth surface in contrast to the verruciform or berry-like appearance of the ordinary adenomatous polyp (Fig. 1). They are often quite large as compared to the usual adenomatous polyp and, when large tend to assume an oval or sausage configuration due to their pliability which permits them to mold in conformity with the lumen of the bowel. The softness of the tumors may also be demonstrated at times by a change in their configuration on compression spot film studies.

FIG. 1

Adenomatous polyp of the colon on air-contrast barium enema. A verruciform or berry-like appearance is apparent.

FIG. 2

(Case 1) Large pedunculated, sausage-shaped lipoma arising at the junction of descending and sigmoid colon.

Although ulceration may occur relatively frequently, this was not demonstrable radiographically in any of the cases which we have studied.

Case Reports

Case 1. Five weeks prior to admission to the hospital this 48 year old white man noted a small amount of bright red blood in his stools. This was accompanied by tenesmus and mild intermittent, cramping lower abdominal pain.

Shortly after the onset of his symptoms, a barium enema was done. A large, sausage-like, polypoid defect measuring 5 by 13 cm. in size was demonstrated; it was attached at the juncture of the sigmoid and descending colon by a pedicle. The margins of this tumor were perfectly smooth and it was more radiolucent than would be expected with a tumor of this size (Fig. 2).

FIG. 3

(Case 2) Intussusceptum in the descending colon; the leading portion of the intussusceptum was a large lipoma.

Approximately 10 days following the barium enema, the patient had an episode of severe lower abdominal cramping pain, followed by a bulky bowel movement. Following this episode he had no further symptoms and bleeding did not recur.

About 4 days later he was operated upon. On opening the bowel an area of induration with an area of necrosis involving the mucosa of the colon, near the junction of the descending and sigmoid colon, was demonstrated. No mass was found. The area was excised. On examination of the tissue the pathologist described an area of colon mucosa which was infarcted. The mucosa was ulcerated and the submucosa was fatty. It was thought this represented the base of a lipoma that had sloughed off spontaneously and had probably been expelled during the severe episode of abdominal pain 4 days earlier.

Case 2. A 49 year old white woman had complained of constipation most of her life; this had become worse during the month prior to hospital admission. For 2 months she had noted intermittent cramping abdominal pain which began in the right lower quadrant but later localized to the left lower quadrant. Two weeks before admission the pain in the left lower quadrant became more severe and was accompanied by nausea and vomiting. Two to three days prior to admission, she passed black jelly-like material. Subsequent evacuations revealed bright red blood with clots. Her pain became more intense to the point that she assumed the flexed position.

Abdominal palpation revealed marked tenderness in the left lower quadrant. An elongated mass was felt in this area and pressure here produced sharp pain referred to the right lower quadrant. Peristalsis was hyperactive with a tinkling quality to the tone.

On the 3rd hospital day an exploratory laparotomy was performed and no masses were palpated. The surgeon noted that the transverse colon, ascending colon, and cecum were markedly dilated beginning at the splenic flexure. The descending and sigmoid colon appeared normal. A transverse colostomy was performed.

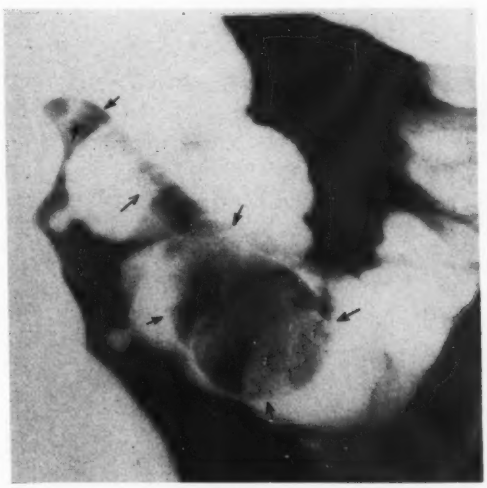
Shortly thereafter a barium enema was requested and a complete obstruction to the retrograde flow of barium was encountered in the mid-descending colon. There appeared to be a large polyp causing intussusception which was evident on the radiographs (Fig. 3). Upon operation one week later, a tumor was found in the distal transverse colon near the splenic flexure. Pathologically this proved to be a submucosal lipoma; there was evidence of ulceration on study of the tissue. The specimen measured 3 by 4 cm. The patient made an uneventful recovery.

Case 3. A 69 year old white woman gave a history of chronic constipation of 20 years duration. For 6 months she had noted intermittent, colicky lower abdominal pain, and a sensation of fullness in the lower abdomen following the evening meal. These symptoms were relieved by the passage of flatus or a bowel movement. The discomfort was, on occasion, relieved by abdominal massage.

Barium enema revealed a large rounded, smooth filling defect in the proximal sigmoid colon measuring approximately 4 cm. in diameter and having a long pedicle. The tumor was quite radiolucent and presented smooth margins (Fig. 4). Several small diverticula were demonstrated throughout the transverse, descending, and sigmoid colon. A lipoma was strongly suspected, though the possibility of an adenomatous polyp or malignant neoplasm could not be excluded.

At laparotomy a soft tumor, yellow in color, was discovered. The tumor had a pedicle and proved to

FIG. 4



(Case 3) Pedunculated lipoma in the midsigmoid colon.

FIG. 5

(Case 4) Nonpedunculated lipoma in the midsigmoid colon.

be a submucosal lipoma of the sigmoid colon. The patient's postoperative course was uneventful.

FIG. 6

(Case 4) Pathologic specimen following surgical resection.

Case 4. This 59 year old white woman had complained of chronic constipation for approximately 20 years. Recently there had been alternating diarrhea with constipation. She had developed generalized lower abdominal pain which was relieved by the passage of flatus and by bowel movement.

Barium enema revealed a large round, smooth filling defect measuring 4 cm. in diameter in the midsigmoid colon. The lesion was quite radiolucent (Figs. 5 and 6). The tumor could be visualized on the post-evacuation films. Again a lipoma was suspected.

At operation a large nonpedunculated submucosal lipoma was removed from the midsigmoid colon.

Case 5. This 48 year old white woman had been well in the past except for a duodenal ulcer which had been confirmed by radiographic studies. Three weeks prior to hospital admission she developed abdominal distention with dull aching pain over the lower abdomen which occurred intermittently. There was some pain on defecation, and on occasion she noticed small amounts of bright red blood in her stools. At this time a barium enema done in another city revealed a partially obstructing lesion near the junction of descending and sigmoid colon (Fig. 7). Shortly after the barium enema the patient passed a large mass by rectum. The mass was recovered, and on pathologic study proved to be a lipoma.

Two days later another barium enema was performed at Emory University Hospital. The filling defect noted on earlier studies was no longer present. However, there was slight irregularity of the sigmoid colon near its juncture with the descending colon which was thought to represent the site at which the tumor had been attached (Fig. 8). Subsequent barium studies of the colon have revealed no abnormalities.

Case 6. This 49 year old white man had a past

FIG. 7

(Case 5) Partial obstruction near junction of descending and sigmoid colon produced by a lipoma prior to its spontaneous expulsion.

history of duodenal ulcer. There had been previous episodes of gastrointestinal bleeding apparently related to his duodenal ulcer. For 3 days prior to his admission, he had noticed weakness, epigastric fullness and melena. There had been chronic constipation for several years.

An upper gastrointestinal study revealed no radiographic abnormalities. Barium enema revealed a small rounded filling defect, measuring approximately 2 cm. in diameter, at the juncture of the sigmoid and descending colon. Air-contrast studies the following day confirmed this finding; it was thought to be an adenomatous polyp of the colon (Fig. 9).

Shortly thereafter, at operation a small lesion, 2 cm. in diameter and yellow in color was removed from the proximal sigmoid colon. Pathologic studies revealed this to be a nonpedunculated submucosal lipoma. No evidence of ulceration was seen on the specimen.

Case 7. This 49 year old white man had noticed intermittent abdominal pain for a period of 6 years. This usually began in the left lower quadrant, and on occasion became generalized. The pain was colicky in nature and lasted for four to five minutes.

Four weeks prior to admission the patient had a severe attack of pain which was not relieved by symptomatic medication. However, there was temporary relief following a bowel movement. Barium enema revealed a large filling defect in the distal transverse colon. This measured 4 by 6 cm. and was

FIG. 8

(Case 5) Barium enema shortly after spontaneous expulsion of the lipoma showing only slight irregularity of the lateral wall of the colon at the site where the lipoma had been attached.

FIG. 9

(Case 6) Small lipoma of the proximal sigmoid colon shown on air-contrast barium enema.

FIG. 10

(Case 7) A large pedunculated, sausage-shaped lipoma is demonstrated in the distal transverse colon.

quite radiolucent with smooth margins and appeared to be pedunculated (Fig. 10).

At operation a large pedunculated lipoma was removed from the distal transverse colon near the splenic flexure. Pathologic studies confirmed the diagnosis.

Comment. Although the correct diagnosis of lipoma was not suggested by the radiologist in this case, it presents the classic features and it is believed that one would undoubtedly suggest this diagnosis at the present time. This was the second case of lipoma of the colon observed at Emory University Hospital.

Discussion

In the 7 cases reported here, all patients complained of symptoms which ultimately led to the study of the colon and an etiologic diagnosis. In 3 (Cases 1, 3 and 4) the diagnosis was suggested by the radiographic findings. In case 6 the lipoma was small, measuring 2 cm. in diameter, and it was thought by the radiologist to represent an adenomatous polyp. In case 2 the radiologist noted the presence of a large polyp which he interpreted as the possible cause of intussusception, but the possibility of a lipoma was not mentioned. The studies in case 5 were not available to our department until after the lipoma had been expelled spontaneously. Case 7 presents typical radiographic findings, and it is felt that the diagnosis would now be strongly suspected with our present knowledge of this condition.

One patient of the 7 had intussusception. Three had gastrointestinal bleeding which was thought to be related to the presence of the lipoma. Two patients expelled the lipoma spontaneously prior to surgical intervention. Five patients had lower abdominal pain which was thought to be related to the presence of this benign tumor. Of the 7, 4 complained of constipation of a significant degree and only one had diarrhea which alternated with constipation (Table 1).

In one case ulceration of the tumor was reported by the pathologist. In cases 1 and 5 the pathologic report failed to state whether or not ulceration was present, although both of the patients had significant rectal bleeding. Four of the lipomas in one series were pedunculated.

Conclusion

(1) Seven cases of lipoma of the colon, which have been studied at the Emory University Hospital since 1949, have been reported.

(2) It is believed that a lipoma may be suspected by the findings on radiographic examination of the colon in a majority of cases. It was suspected in 3 of the 7 cases reported and, in retrospect, it is believed the diagnosis would be suspected now in 2 additional cases (2 and 7).

(3) Lipomas of the colon are most often submucosal and frequently are pedunculated.

(4) Although 50% of the previously reported cases have occurred in the cecum and ascending colon, all 7 of these tumors were situated in the distal half of the colon.

(5) The presence of intussusception in an adult should make one suspect the possibility of a lipoma of the colon.

TABLE 1

TABULATION OF SYMPTOMS AND COMPLICATIONS IN 7 CASES OF LIPOMA OF THE COLON OBSERVED AT EMORY UNIVERSITY HOSPITAL FROM 1949 TO 1958

Case	*Constipation*	*Abdominal Pain*	*Diarrhea*	*Intussusception*	*Ulceration*	*Hemorrhage*	*Pedunculated*	*Spontaneous Expulsion*	*Diagnosis Suspected By Radiographic Study*
I	No	No	No	No	Not Recorded*	Yes	Yes	Yes	Yes
II	Yes	Yes	No	Yes	Yes	Yes	No	No	No
III	Yes	Yes	No	No	No	No	Yes	No	Yes
IV	Yes	Yes	Yes	No	No	No	No	No	Yes
V	No	Yes	No	No	Not Recorded*	Yes	Yes	Yes	No
VI	Yes	No	No	No	No	Questionable	No	No	No
VII	No	Yes	No	No	No	No	Yes	No	No
Totals	4	5	1	1	1	3	4	2	3

*Ulceration not recorded by pathologist, although rectal bleeding present.

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CASE REPORT

Tietze's Syndrome Associated with Paroxysmal Recurrent Tachycardia*

JULIAN E. JACOBS, M.D., *Charlotte, N. C.*, and
JAMES J. CONNERS, M.D., *Jacksonville, Fla.*

TIETZE'S SYNDROME is a painful, benign, nonsuppurative swelling of the costochondral or costosternal junction which was first described by Tietze[1] in 1921 (Figs. 1 and 2). The second costal cartilage is involved alone in about 60% of reported cases and in another 15% is involved in conjunction with other costal cartilages. The etiology of Tietze's syndrome has never been definitely established. Tietze suggested a nutritional disturbance since nutritional disturbances were prevalent in Germany at the time. Tuberculosis has been suspected in many cases, but has never been proved. Motulsky and Rohn[2] feel that involvement by microtrauma or disease or an inconstant intraarticular ligament may play a role (Fig. 3). Microtrauma may be caused by paroxysms of coughing or the ligament may be affected by rheumatoid involvement. This ligament is present almost always at the second costosternal junction and with decreasing frequency at the others. This parallels the incidence of involvement of these joints with Tietze's syndrome. Clinically, nontuberculous respiratory disease and rheumatoid conditions often precede the onset of chest pain.

This syndrome can affect any age group with the highest incidence in the third decade; however, Coley[3] reports twenty cases, most of them in teen-age girls. Both sexes are equally affected.

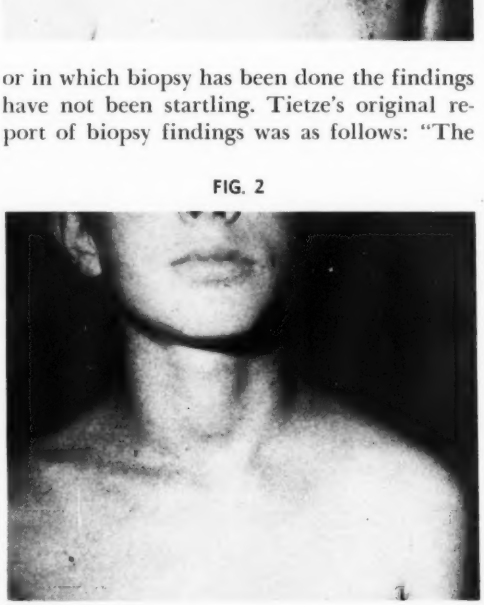
The x-ray studies are negative as are the routine hematologic and urine studies.

Because of the benignity of the condition, not too many pathologic sections have been reported. In lesions which have been resected

FIG. 1

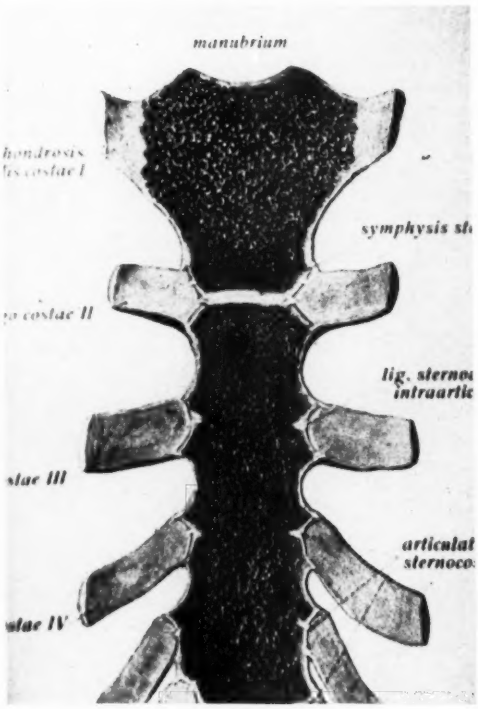
or in which biopsy has been done the findings have not been startling. Tietze's original report of biopsy findings was as follows: "The

FIG. 2



*Read before the Section on Orthopedic and Traumatic Surgery, Southern Medical Association, Fifty-Second Annual Meeting, New Orleans, La., November 3-6, 1958.

FIG. 3



histological examination shows chondral tissue, the irregular arrangement of which suggests neoplasm, but there are no signs of malignancy. I, therefore, removed the entire mass which consisted of two cartilages and part of the sternum. To our surprise, the cartilages were not abnormal; the soft tissues, perichondrium, muscles, fascia and ligaments were thickened, but microscopically did not show any inflammatory changes. The cartilage showed histological changes described above, and here and there deposits and dissolution into fibres."

The course of the disease can vary from several weeks to several years. During this time the degree of pain will have exacerbations and remissions; however, the swelling is usually persistent to some degree for some time.[4,5] Treatment usually consists of heat, salicylates, injections with procaine or hydrocortone, x-ray treatment and, in resistant cases, resection of the involved portion.

In considering the differential diagnoses any inflammatory, neoplastic or traumatic condition affecting these joints must be ruled out; in addition to any intrathoracic pathology causing referred pain to the chest wall.[6]

We would like to report a case of Tietze's syndrome associated with a severe recurrent paroxysmal tachycardia. The tachycardia did not respond to medication. Following resection of the involved costochondral junctions, the patient was completely relieved of her tachycardia. Nowhere in the literature have we found a similar case.

Case Report

A 24 year old white married woman began having pain in her left anterior chest wall in Feb., 1954. This was rather persistent, not related to activity, even being present when she was lying in bed. The onset of the chest pain was not preceded by any respiratory or rheumatoid condition.

For the previous two years (1952-1954), she had been having frequent episodes of tachycardia (as often as once a day, lasting one to fifteen minutes), sometimes coming on while at bedrest. She had never sought medical aid because they had not been associated with pain.

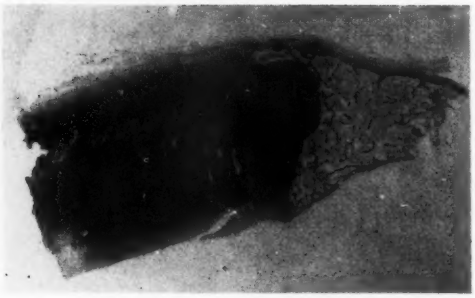
In Mar., 1954, she was seen by her internist who found she had a pulse rate of 80 to 160. Her blood pressure was 110/80. Her rate was regular and heart normal in size without murmurs or rales. The rate could be slowed by carotid sinus pressure as well as the Valsalva maneuver. Electrocardiogram showed paroxysmal supraventricular tachycardia possibly of nodal origin. There was tenderness of the fifth costochondral junction on the left with some questionable swelling.

She was started on quinidine sulfate (0.3 Gm. q.i.d.) without benefit. Later she was started on Pronestyl (0.25 Gm. q.i.d.) in addition to the quinidine and still she had no relief of her tachycardia. She was given digitoxin to the point of nausea and still there was no effect on her tachycardia. Sodium butisol (0.03 Gm. t.i.d.) was of only minimal benefit. In April, the tender costochondral junction was injected with procaine and hydrocortisone by her internist with only temporary relief. This patient was unable to do her housework.

She was seen by us in June, and found to have tenderness and swelling of the fifth, sixth and seventh costochondral junctions on the left side of her chest. The rest of her orthopedic examination, including spinal motion, was negative. There were no dermatome changes on either side of the chest. X-ray studies of the ribs, chest and spine in this area were negative. Injections of the involved fifth, sixth and seventh costochondral areas with hydrocortone were tried without any relief. Because of the persistence of pain, she was given five treatments of irradiation (a total of 700 r. units) to the involved areas without any relief of her pain. After 2 months of observation, following her x-ray therapy, operation was advised because she was almost totally incapacitated due to pain in this area, and having as many as ten paroxysms a day, requiring almost complete bedrest.

On Sept. 2, 1954, after detailed consultation with a

FIG. 4

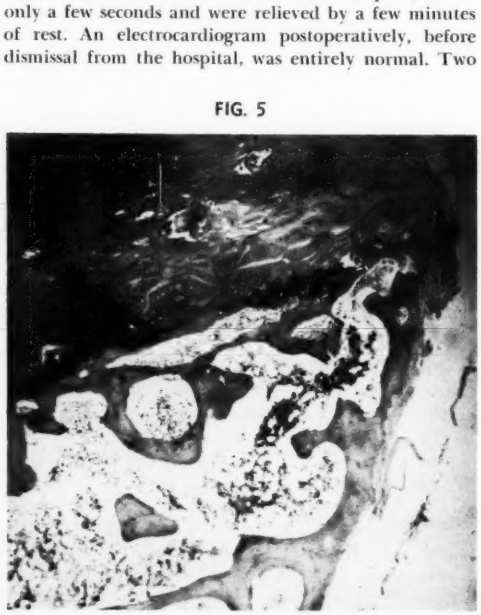


medical consultant and anesthetist, endotracheal anesthesia was administered. The costochondral junctions of the fifth, sixth and seventh ribs on the left side were resected for 1½ inches through one curvilinear incision, just beneath her breast. Grossly there was some thickening of the soft tissue but the cartilage appeared normal. The costosternal joints were not resected since she had had no tenderness at these sites. She withstood the operation well and her postoperative course was uneventful.

The histologic sections did not reveal anything remarkable. As can be seen under low power, the costochondral junction demonstrated a normal pattern, and under high power there was only an infrequent minute focus of fibrillary changes in the cartilage (Figs. 4 and 5).

For the first five days postoperatively, she had no attacks of tachycardia. Her pulse rate ranged from 68 to 82, then she started to have mild attacks of paroxysmal tachycardia, approximately every fifth day, for 3 weeks. These were never associated with pain, lasted only a few seconds and were relieved by a few minutes of rest. An electrocardiogram postoperatively, before dismissal from the hospital, was entirely normal. Two months after operation the patient was taking no medications for either pain or any tachycardia, and had had only three attacks in one month, that responded well to merely bedrest. The patient started feeling so good that she abandoned her presurgical idea of wanting no more children, became pregnant, went through an entirely normal pregnancy without complications, delivering a normal baby one year from the time of her operation. A recent check-up, 4 years from the time of her original operation, indicates the patient is doing all her own housework, having had one small paroxysm of tachycardia one year and 4 months from the time of surgery, lasting less than a minute, relieved by lying down. The patient has had no tachycardia in the last 2 years and 8 months. Her blood pressure was 122/82, pulse rate 82, respirations 20.

FIG. 5



Discussion

We do not claim any direct relationship between Tietze's syndrome and paroxysmal tachycardia, but it is conceivable that reflex chest pain could act as a trigger-mechanism setting off the paroxysms. The lack of response to the usual medical management in this case preoperatively makes this patient's postoperative course much more significant. The fact that she went through a normal pregnancy, is doing her own housework, speaks well for her general physical condition. A 5 year history and a 4 year follow-up through our clinic is recorded.

Summary

We are reporting a case of recurrent paroxysmal tachycardia resistant to medical treatment, totally disabling the patient, and associated with Tietze's syndrome, relieved by resection of the involved costochondral junctions.

Acknowledgment

We wish to thank Dr. Lee Large, Pathologist, Presbyterian Hospital, Charlotte, North Carolina, for reproduction of the microscopic slides.

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5. Gill, A. M., Jones, R. A., and Pollak, L.: Tietze's Disease (Non-Suppurative, Non-Specific Swellings of Rib Cartilage), Brit. M.J. 2:155, 1942.
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Discussion (Abstract)

Dr. C. F. Gregory, Dallas, Tex. We might begin this discussion by defining the term syndrome. The

term derived from the Greek word, Syndromos, meaning a running together. Thus, the occurrence of anterior chest wall pain, together with a palpable tender enlargement of one or more costal cartilages in the same area, is generally considered to represent Tietze's Syndrome. Should other distinct symptoms or signs be present in the area, some other diagnosis must be considered. Observations of the natural course of the disorder, of treated cases, and in a few cases, studies of the affected tissues have provided some information of value although the cause or causes are not as yet clearly determined.

The syndrome occurs in many age groups, but most frequently in the third decade. The apparent predominance of one sex in some reports, such as those of Geddes and of Gill and associates, loses significance when one considers that both men were in military service when they observed their cases.

In his original article in 1921, Tietze considered that this syndrome might be associated with malnutrition. It was considered again by Griffiths and Evans in 1942 when they reported abnormally low urinary vitamin C, B_1 and B_2 levels in two cases. Malnutrition has not been seriously considered since that time.

Infection has often been suspected because many observers could relate some, but not all, of their cases to respiratory infections appearing either before or after the appearance of the Tietze's Syndrome. But neither laboratory studies done nor those reported have yielded any consistent evidence to confirm infection as a cause.

It is equally evident from the natural course of the disease and from microscopic examinations of tissue made available for study, that the lesion is not a neoplasm in the strict sense. One report only has said that the tissue studied was *"consistent"* with the features of a chondroma. While microscopic foci of degenerative cartilage have sometimes been observed in the tissues studied, this finding has not been consistent either. Further, degenerative changes in the costal cartilages including calcification have been observed many times as asymptomatic incidental findings in x-rays.

As pointed out by Dr. Jacobs, Motulsky and Rohn suggested a disorder of the "inconstant" inter-articular ligament, most "constant" at the second costal cartilage articulation. Could the microtraumas of coughing due to *any* pulmonary disorder produce a lesion of this nature in the costal cartilage? There is some evidence that it may.

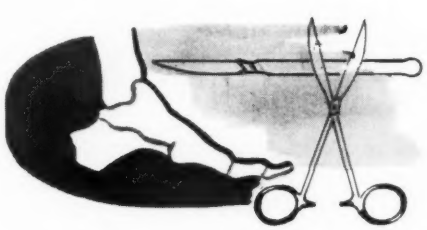
Two basic patterns have been noted in reviewing the physical findings described, and the gross pathology noted where surgical exploration has been carried out. The first pattern has been a fusiform enlargement of the costal cartilage or cartilages together with thickening of the adjacent tissues, while the cartilage itself appears normal. Such was Dr. Jacobs' finding.

The second pattern is that of a cartilage of normal size and texture simply buckled forward out of position.

It seems permissible then, to consider that at least two different pathologic states may occur to account for Tietze's Syndrome.

Since Drs. Jacobs and Conners' case is the first one to record continuing paroxysmal tachycardia as a concomitant feature, it seems most likely that the tachycardia in this case was a result of, rather than a part of the costal cartilage disorder. Paroxysmal tachycardia, we are told, may appear from a host of essentially unrelated patho-physiologic states. Even emotional stress, excessive smoking or the combination of fatigue and excitement may set this condition in motion. Dr. Jacobs' case does clearly emphasize that whenever the syndrome alone or with concomitant disorders remains intractable to those conservative measures suggested, and it is disabling, surgical excision for therapy as well as for diagnosis is indicated. So it was in this report.

In closing, may I commend the authors for a very well documented case report. Too few of these are available, and more will be necessary before the true cause and nature of this vexing, yet interesting syndrome will become known to us.



Pylons and Temporary Prostheses in the Rehabilitation of Lower Extremity Geriatric Amputees*

LEWIS A. LEAVITT, M.D.,† *Houston, Tex.*

In the rehabilitation of geriatric patients especially, in whom a prosthesis is to be fitted eventually to an amputated limb, it is essential that certain complications be avoided to attain ultimate success. Therefore the temporary use of prostheses may be indicated.

A PROSTHESIS for the below-knee or above-knee amputee should restore him to adequate locomotion, within the limitations of the individual. Thorough understanding of what the amputee has lost and what remains is necessary to properly prescribe the prosthesis, secure a physiologic fit, an acceptable cosmetic effect, and train the amputee in a pattern of proper gait.

The Orthopedic and Prosthetic Appliance Clinic Team, comprised of orthopedists, physiatrists, therapists, orthetists and prosthetists, promotes over-all evaluation of the patient in need of a prosthesis. Consultive services from a psychologist, psychiatrist or social worker are available when indicated. In general, most amputees can be evaluated initially by this clinical team. However, in some geriatric patients or in patients over 50 years of age, particular attention must be given to the following specific considerations:

1. Status of peripheral vessels.
2. Metabolic status—i.e., diabetes, etc.
3. Psychologic status—i.e., motivation, insight, cooperation.
4. General physiologic status—i.e., cardiovascular, neurologic, osseous, and respiratory.
5. Vocational economic status—capable of using prosthesis productively.

Evaluation of these factors is necessary to determine whether or not the patient should be considered for increased activities. If found to be feasible, the use of the pylon or temporary prosthesis helps to evaluate more objectively the patient for prosthetic ambulation.

Frequently, elective surgery is not possible in these patients and impending gangrene, peripheral vascular insufficiency and metabolic dysfunctions result in emergency surgical procedures. Lumbar sympathectomies, peripheral vascular surgery and/or amputation are often indicated. If possible, the amputation site should be 5 to 7 inches below the knee or 3 to 4 inches above the knee, because shorter lengths are difficult to fit with a prosthesis and flexion contractures are prone to occur. Weight-bearing within the prosthesis should be distributed over large areas and longer lever arms of the amputated leg decrease physiologic stress in locomotion with prosthesis. It has been shown that 12% more energy is required for walking with a prosthesis than in normal ambulatory activities with two sound limbs. Likewise, ambulatory activities using crutches and the remaining lower limb require more energy and create more stress than walking with a well-designed, well-fitted prosthesis, after proper gait training. Therefore, it is important for the surgeon to amputate at levels, whenever possible, to give longer stumps (lever arms) which decrease the stress or energy requirement over that of shorter stumps.

Therapeutic Programs

In patients who have three or more positive findings of the considerations listed previously, a permanent prosthesis would be contraindicated, uneconomical and possibly hazardous for patients to use. In these pa-

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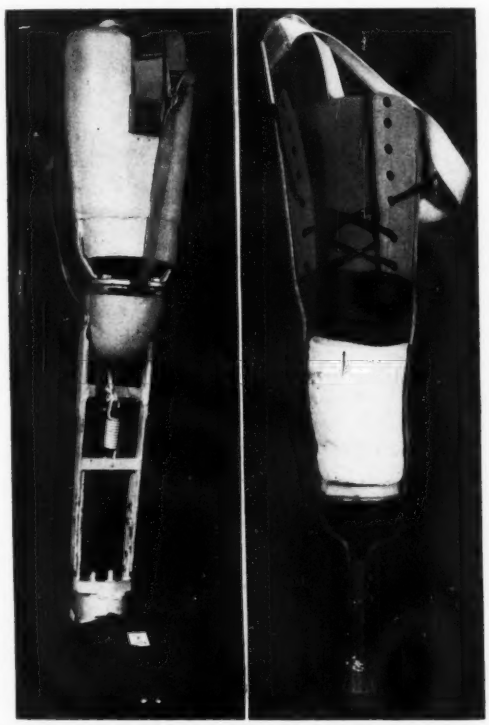
tients the prescription of a temporary prosthesis, as a portion of their therapeutic regimen, makes it possible to evaluate the patient objectively and to determine rehabilitative prosthetic goals (Fig. 1, A).

The temporary prosthesis, in contradistinction to the pylon, incorporates the biomechanical principles of a permanent prosthesis; that is, proper fitting socket of plaster-of-paris or Celastic, free knee joint, and prosthetic foot and ankle. Proper dynamic alignment is necessary to prevent patterns of poor gait and to make easy the transition to a permanent prosthesis, when indicated. The prosthetic foot and ankle are those salvaged from the local brace or prosthetic shops and re-used in succeeding fabrications.

The pylon is a "peg leg" type of prosthetic device and is comprised of a "socket" with double uprights, stiff knee, thigh corset if below-knee, and a single adjustable metal shank with rubber crutch tip for walking surface (Fig. 1, B). Such a prosthetic device is good for use for a short time to permit shrinkage of the soft tissue of the stump (amputated leg), gain early ambulation, restore balance, prevent flexion contractures of the knee or hip of the sound limb and/or amputated limb, and to evaluate physiologic demands. It is usually not used over 4 to 6 weeks, since patterns of poor gait (circumduction, pelvic swing, hiking, etc.) are formed and are not easily broken when a permanent prosthesis is fitted.

FIG. 1



A B

(A) Temporary prosthesis. (B) Pylon.

Construction of the temporary prosthesis incorporating those principles as described allows the patient to gain good balance with a prosthesis and to become accustomed and trained in phases of swing and stance. Thus poor patterns of gait usually do not occur, and there is an easier transition to a permanent prosthesis for these geriatric patients, or other patients with physiologic problems which prevent an initial prescription of a permanent prosthesis.

Geriatric patients often have multiple diagnoses of a peripheral vascular syndrome, osteoarthritis, diabetes, etc., and it is important that they gain early and progressive ambulatory activities. Prolonged bedrest and other sedentary activities cause decreased blood flow, disuse atrophy, muscle wasting and bone absorption. It is a well-accepted fact that even normal persons who are immobilized for several weeks lose significant amounts of calcium, sulphur, phosphorus, nitrogen, and potassium. Creatinine metabolism, control of circulation in the upright position, muscle mass and strength are also significantly impaired. These harmful effects of immobilization can be decreased by gaining early activities in the upright position; the oscillating bed started early in the convalescent and rehabilitative program is important in decreasing the harmful effects of immobilization. The oscillating bed aids the blood flow into collateral channels in the affected limbs which are below the cardiac level. The alternate filling of the limb with blood, then draining it by change in position is achieved with the oscillating bed which rocks slowly back and forth, raising the head and lowering the feet with each oscillation. The rapidity of oscillation and the angle of depression of the bed is adjusted to the physiologic need of each pa-

tient and, as the circulation improves, indicated readjustments are made. In general, it is the aim of this device to maintain sufficient elevation in the upswing for the veins to collapse but not to produce pallor in the capillary bed of the toes.

Another therapeutic program used in the treatment of such patients is to produce reflex vasodilatation in the lower extremities by either a heating pad to the lower abdomen or, sometimes more efficiently, by utilizing short-wave diathermy, subminimal technic, with a large drum over the lower abdomen for 30 to 40 minutes. The lower limbs are wrapped in a cotton blanket and then in a wool blanket to increase the collateral blood flow in the involved lower extremities. This is shown in the following case.

J. H., a 58 year old man gave a history of diabetes mellitus and arteriosclerosis obliterans for several years. Impending gangrene resulted in a right below-knee amputation. Several weeks postoperative, he was referred to Physical Medicine and Rehabilitation with the above findings.

Tests of skin temperature and oscillometric studies indicated further circulatory involvement of the left lower extremity, particularly of the foot and distal one-third of the leg. Femoral and popliteal pulses were good; impairment was noted in the dorsalis pedis and posterior tibia. Symptomatically the patient complained of his left foot becoming "sleepy" when lying down or walking with crutches for distances of 150 feet.

Reflex vasodiathermy was applied to the pelvis with the technic previously described, for 45 minutes daily, and followed by Buerger-Allen exercises three times daily. Such a program was continued for 3 months on an outpatient basis and, at this time, the oscillometric readings revealed essentially the same findings as at the initial tests, but the readings on the skin temperature were markedly improved, or there was improvement of the collateral circulatory bed.

He was then fitted with a pylon and was able to walk distances of 6 to 8 city blocks, and became ambulatory for 4 to 5 hours per day. A permanent prosthesis was then prescribed and the patient is now working an 8 hour day as a porter in the housekeeping section of a local industry. At six months a re-evaluation showed no further change in the left lower extremity.

As the patient improves, he is encouraged to participate early in upright activities in the position for increasing lengths of time which can be achieved passively by the portable standing bed. Sometimes, it has been found helpful to wrap the lower extremities with Ace bandages to above the knees or prescribe above-the-knee elastic stockings measured for the individual. This prevents the engorgement of the venous side of the circulatory system. As the patient improves he is encouraged to start ambulation initially in the parallel bars, according to his over-all tolerance, and it is at this time that pylon and/or temporary prosthesis is found very advantageous.

In the care of the below-knee or above-knee stump, specific steps are necessary. If the patient is having some pain in the soft tissue of the amputated limb, it has been found that treatment in the whirlpool bath, at a temperature of 98 degrees for 15 minutes, followed by ultra-sound therapy (utilizing the stationary, 65 cm. head* immersion technic, one watt for 20 minutes) to the tissues of the stump is very helpful in decreasing the pain and promoting deep healing of the involved tissue. This is followed by wrapping the stump, utilizing the accepted figure-of-eight technic. In wrapping the stump, usually utilizing the 4 inch Ace bandage for below-knee amputations and the 6 inch Ace bandage for the above-knee amputations, it is important that the wrapping be the full length of the proposed prosthetic socket so additional fitting problems are not incurred. Preconditioning of the hip-girdle musculature, as well as quadriceps, hamstrings musculature, for the below-knee amputation, is paramount to increase circulation to the tissues involved, prevent flexion contractures of the hip and hamstring muscles and allow adequate coordinative control of the temporary prosthesis in ambulatory activities.

It has been very interesting to note the comparative studies of patients in ambulatory activities using crutches as against those using temporary prostheses. Relatively accurate measurements of such patients' ambulatory activities are secured by use of the treadmill available in our clinical program (Fig. 2). This treadmill has variable speeds, from 50 feet per minute to 210 feet per minute, and offers an excellent opportunity to evaluate the rate and length of time a patient can walk prior to the onset of intermittent claudication. It also makes it possible to determine a pace which the patient can maintain for increased lengths of distances which are just below those which would cause claudication. In several patients it has been shown that their length of ambulation at the same rate has been approximately doubled by using the

*Manufactured by R. J. Lindquist Co.

temporary prosthesis over that of walking with a crutch with only the sound limb and no temporary prosthesis. This further justifies the rehabilitation with prosthesis of those patients who normally would not be considered for ambulatory activities, but would be, more or less, forced to wheel chair activities. As noted by Foley,[1] it has been shown that walking as a therapeutic regimen is indicated in localized necrosis due to arterial insufficiency from thromboangiitis obliterans, arteriosclerosis obliterans and embolic phenomena. Thus, it is my opinion that with a program of adequate and total rehabilitative, pre-conditioning activities, the older patient can decrease the physiologic stress of ambulation by the use of a temporary prosthesis on the amputated limb, and that such an increase of ambulatory activities is one of the better treatment programs for the remaining sound limb.

A typical case history which illustrates many of the therapeutic regimens utilized in the prosthetic rehabilitation of such patients follows:

H. W., a 58 year old Negro, had an amputation at the junction of the middle and upper thirds of the right thigh, in 1945, because of circulatory insufficiency. He walked successfully on an above-knee prosthesis (conventional type) until his hospitalization in May, 1957.

FIG. 2

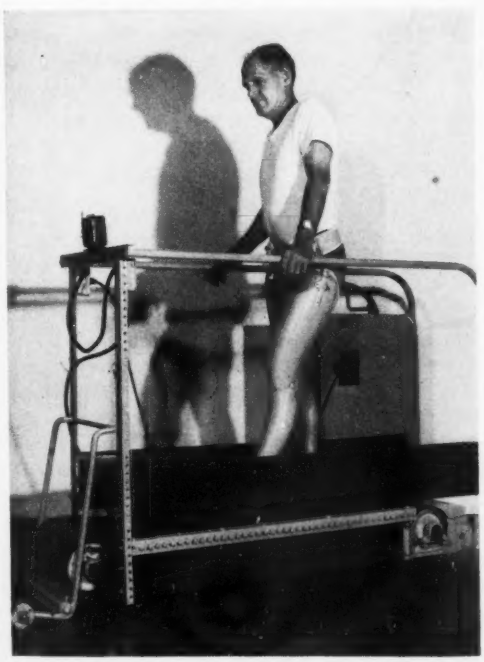


FIG. 3

"Stubbies"

Surgical evaluation revealed Leriche's syndrome and after several operative procedures, including a right lumbar sympathectomy, and an operation for abdominal aorta homograft and a left femoral "bypass," it was necessary to amputate the left lower extremity above the knee, at the junction of the middle and lower third, in June, 1957. Upon referral to the Department of Physical Medicine and Rehabilitation, the patient was found to be quite debilitated, essentially confined to a wheel chair, with bilateral flexion contractures of the hip of 60 degrees. Under a rehabilitative program he showed improvement and a strong motivation for ambulation with prostheses. Therefore, he was fitted with "stubbies" and short forearm crutches to gain additional balance and to decrease the flexion contractures of the hip. These "stubbies" were made of molded Celastic, with walking heels, at the anatomic level of the knee joint (Fig. 3). As the flexion contractures decreased and metric tolerances increased, he became ambulatory on such prosthetic devices for several hours a day. Upon presentation to the Orthopedic and Prosthetic Appliance Clinic Team, an above-knee prosthesis of the suction socket type, with single action knee joints, Sach feet, and 4 inches shorter than physiologic limb length, were approved and prescribed. At 3 months re-evaluation and now, the patient is wearing his prosthesis 8 to 10 hours per day.

Summary

We have found that the utilization of the pylon or temporary prosthesis, in the rehabilitation of the lower extremity amputee with

complications common to the geriatric patients, has been found to be very advantageous. The incorporation of the technics, as discussed, into our over-all program of rehabilitation has made it possible for many patients to walk successfully with permanent prosthesis who, on initial evaluation, were thought to have contraindications for walking with prostheses.

Reference

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How Good is the Reiter Protein Complement Fixation Test for Syphilis?*

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The search for serologic aids in the diagnosis of syphilis continues. The evaluation and comparison of several serologic tests described in this paper is most interesting and informative.

SEROLOGIC EVALUATIONS recently conducted by the Public Health Service have led to the following conclusions:

1. The *sensitivity* and *specificity* of the various tests using the Reiter protein antigen, as well as the *reproducibility* of results in different laboratories indicates the value of the routine performance of a form of this test as a valuable serologic *aid to diagnosis.*

2. The combined use of tests done with a nontreponemal antigen and the Reiter protein antigen routinely, either on all blood specimens or on those reactive to the test with a nontreponemal antigen, would seem to be indicated.

3. Interpretation of the results of this test, as well as in all tests with treponemal and nontreponemal antigens, must be done in the light of clinical and historical findings.

The importance of this latter conclusion is emphasized in the comparisons of the Kolmer Reiter Protein (designated as KRP), the TPI (treponemal immobilization) and the VDRL slide tests which are presented in the following figures. These three tests were performed at the Venereal Disease Research Laboratory on the same specimen of serum. The TPI test is the one routinely employed on reference specimens from physicians in the United States at the Venereal Disease Research Laboratory and is the one entered in the serologic evaluation as TPI-200—the "200" signifying 200 units of complement.

Figure 1 presents a comparison of these three tests in the early detection of syphilis. It will be observed that the KRP becomes reactive almost as rapidly as the VDRL slide test in early syphilis, the difference in the two tests appearing principally in specimens giving weakly reactive results. The differences observed between the TPI and these two tests in primary syphilis are practically eliminated in the secondary stage.

The cases included in the category of treated early syphilis as shown in figure 2 received a minimum of 2,400,000 units of penicillin 2 to 4 years prior to the time the specimens were drawn. Taking into consideration the reactivity rates on the previous figure, it is apparent that all three types of tests have a tendency to revert to negative following adequate treatment of early syphilis, but that the VDRL slide test becomes nonreactive earlier than the KRP or TPI. The slightly lower reactivity rate to the TPI as compared with the KRP can possibly be attributed to the fact that in some cases treatment was instituted before antibodies detected by the TPI test had appeared.

The specimens included in the category of treated late syphilis were drawn from patients who had been treated with a minimum of 4,800,000 units of penicillin. Treatment, *per se,* has little effect on serologic reversal in late syphilis as shown by the nonreactive rates in this group,—3.4% for the TPI, 8.7% for the

*Read before the Section on Public Health, Southern Medical Association, Fifty-Second Annual Meeting, New Orleans, La., November 3-6, 1958.

†From the Venereal Disease Branch, Communicable Disease Center, and Venereal Disease Control, Fulton County Health Department, Atlanta, Ga.

KRP and 14.2% for the VDRL (Fig. 2). The element of time is a much more important factor. Although the average duration of infection in this group of patients treated for late syphilis is unknown, it is safe to assume that it is far shorter than the duration of infection in the groups presented in figure 3.

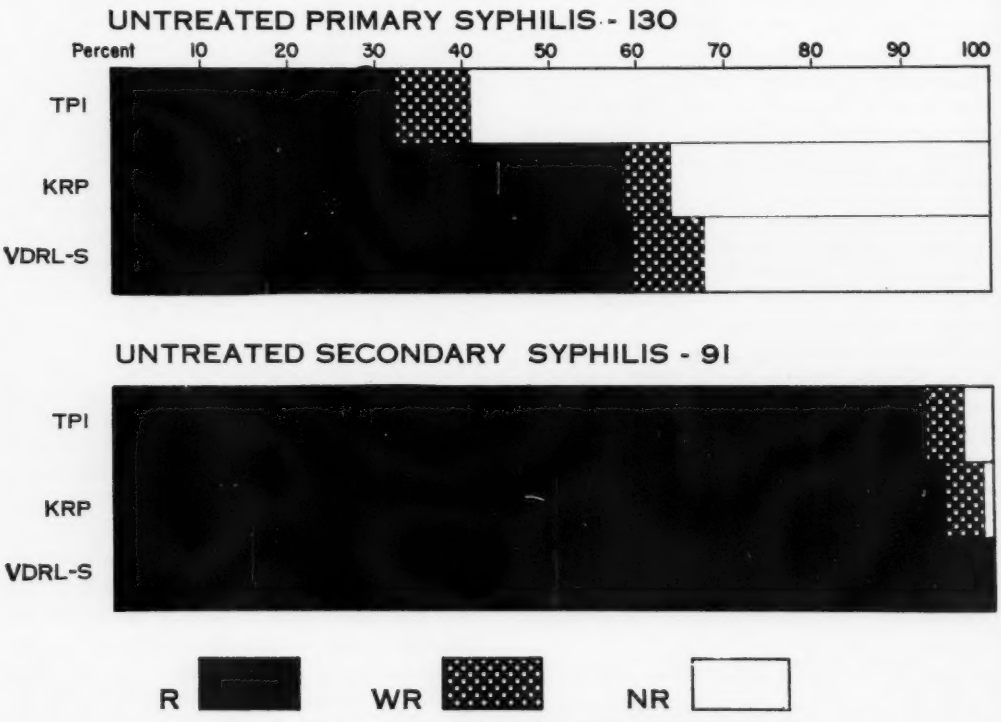
We have included here information from our study of untreated syphilis which was initiated in the fall of 1932. The patients included in the figure completed 25 years of observation in January, 1958. In the first group, patients with no treatment or with a history of mercury rubs or bismuth only, the average duration of infection is 42 years. In this group spontaneous reversal occurred in more than 50% in terms of the KRP and VDRL slide test. The TPI, however, remained reactive in 95 per cent.

The second group represents patients who were treated with what is generally termed "practically no treatment." In this group the average duration of infection at time of examination in 1958 was 36 years. In general these were younger patients with syphilis of shorter duration than those included in the first group, and the small amount of treatment was administered presumably as a precautionary measure. The effect on serology of even this small amount of treatment relatively early in the course of the disease is obvious. Only 10% reacted to the VDRL slide test and approximately 18% to the KRP. Even the TPI was nonreactive in slightly more than 10% and weakly reactive in an additional 6 per cent.

The third group shown in the figure represents patients selected as nonsyphilitic controls on the basis of nonreactive Kolmer complement fixation and Kahn standard floc-

FIG. 1

SEROLOGY EVALUATION AND RESEARCH ASSEMBLY



R—reactive; WR—weakly reactive; NR—nonreactive.

FIG. 2

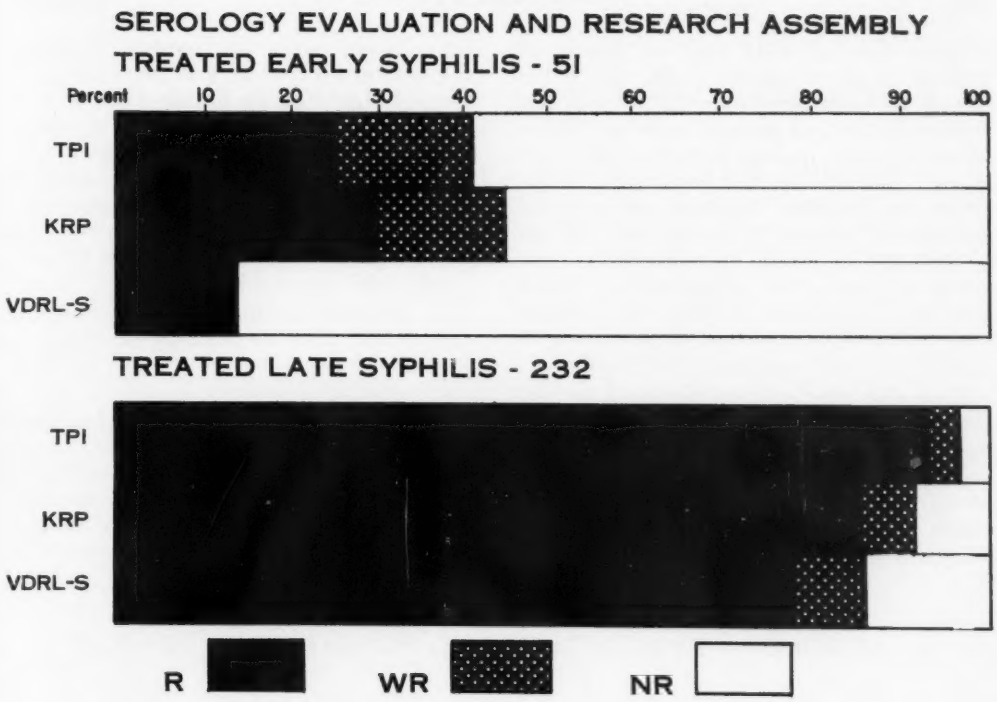
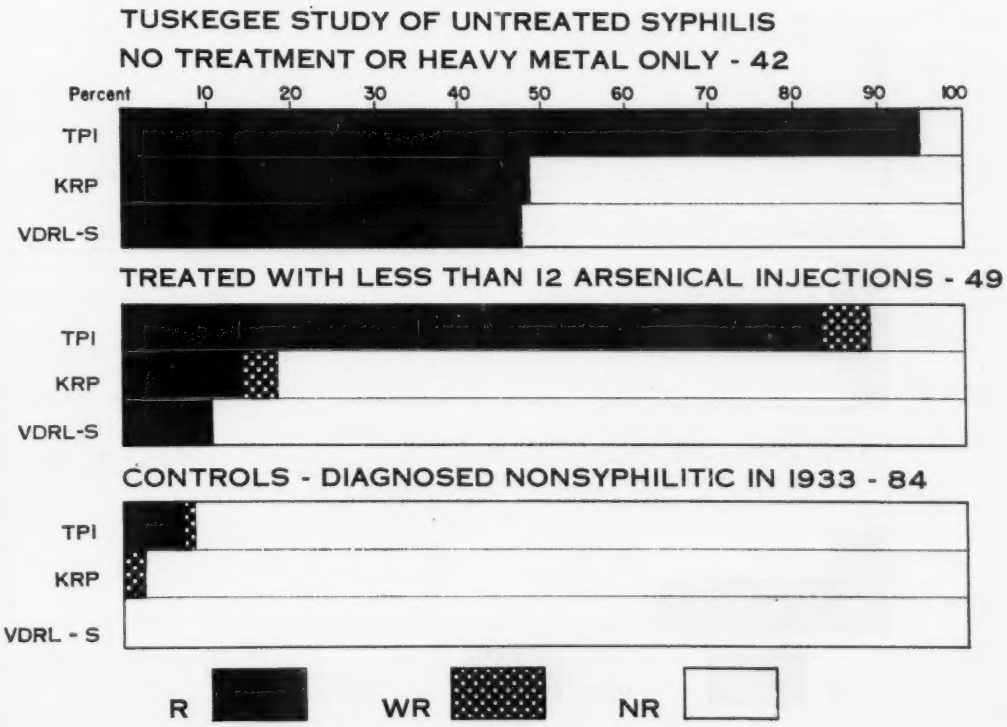

SEROLOGY EVALUATION AND RESEARCH ASSEMBLY
TREATED EARLY SYPHILIS - 51
Percent
10
20
30
40
50
60
70
80
90
100
TPI
KRP
VDRL-S
TREATED LATE SYPHILIS - 232
TPI
KRP
VDRL-S
R
WR
NR

FIG. 3


TUSKEGEE STUDY OF UNTREATED SYPHILIS
NO TREATMENT OR HEAVY METAL ONLY - 42
Percent
10
20
30
40
50
60
70
80
90
100
TPI
KRP
VDRL-S
TREATED WITH LESS THAN 12 ARSENICAL INJECTIONS - 49
TPI
KRP
VDRL-S
CONTROLS - DIAGNOSED NONSYPHILITIC IN 1933 - 84
TPI
KRP
VDRL - S
R
WR
NR

culation tests of 1933 and no history of syphilis. In this group the VDRL slide test is completely nonreactive, the KRP is weakly reactive in 2.4% (2 patients) and the TPI reactive or weakly reactive in 8.3% (7 patients). These 7 patients may have been syphilitic, for when one considers the high percentage of spontaneous reversal to reagin tests in untreated syphilis and the fact that this control group was drawn from a population in which 26% were reactive to at least two serologic tests for syphilis, it would be surprising if syphilis had been completely ruled out.

Returning to the data furnished by the serologic evaluation, a comparison is made in figure 4 of the results of the three tests in three nonsyphilitic categories. In the presumed normal group, the KRP and TPI tests gave almost identical results, both being somewhat more reactive than the VDRL slide test.

In diseases other than syphilis, reactivity ranges from a low of 5.5% to the VDRL slide test to a high of 12.2% for the KRP. The patients in this group had no history of syphilis and no clinical manifestations of the disease. They represent, in general, patients admitted to the hospital with a variety of diseases, a number known to cause false positive reactions. Syphilis, however, could not be completely ruled out of this group.

In the third group, representing patients with leprosy, both the KRP and VDRL slide tests showed reactivity, the VDRL to a much greater extent.

Figure 5 presents two groups of patients diagnosed as having biologic false positive test. The first group had at least one nonreactive TPI; in the second group, the diagnosis was based on the clinician's opinion. In the first group the KRP was reactive or

FIG. 4

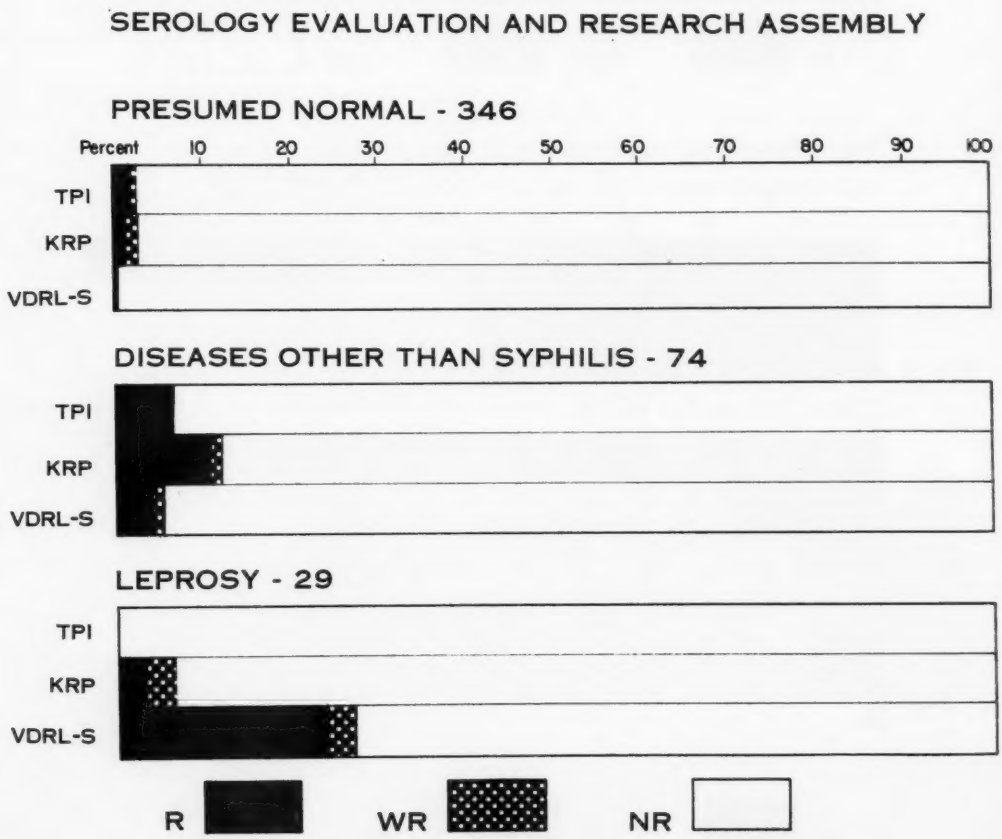
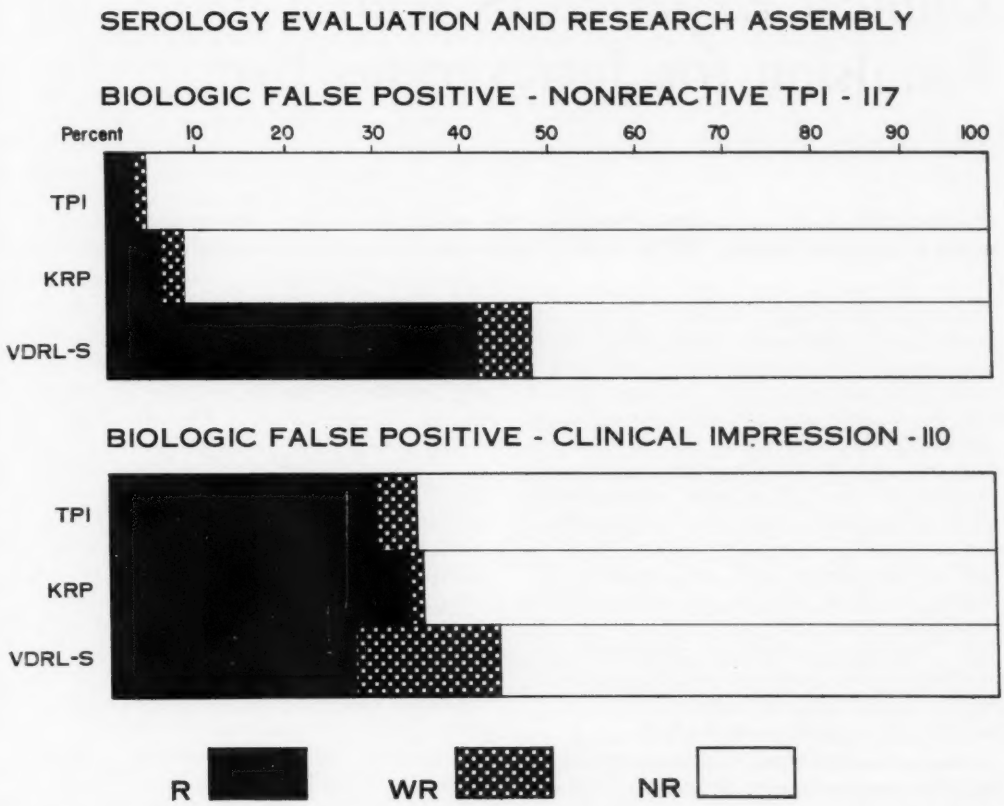


FIG. 5



weakly reactive in 8.6%, the VDRL slide test in 48 per cent. No significance can be attached to the higher reactivity of the KRP than the TPI in this first group, since selection for this category was made on the basis of a nonreactive TPI. The point of interest, of course, is that 4% of the cases diagnosed elsewhere as having biologic false positive tests on the basis of a nonreactive TPI, were TPI reactive at the Venereal Disease Research Laboratory.

In the second group, the differences between tests tend to disappear. The TPI and KRP are reactive or weakly reactive in 34.5 and 35.2%, respectively, and the VDRL slide test in 43.7 per cent.

To *summarize* the foregoing data, the KRP test becomes reactive almost as rapidly as the VDRL slide test following infection, maintains reactivity longer than the VDRL slide test, but, given time, will revert to negative in the same proportion as the VDRL slide test; by comparison it roughly parallels the TPI test in the nonsyphilic, including biologic false positive test, categories.

Clinical Experiences with a Fat Emulsion for Intravenous Use*

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There has been much and increasing interest in the use of fat emulsions intravenously as a means of parenteral feeding. All the technical difficulties have not been completely overcome as yet.

FAT when metabolized yields 9 calories per gram. Carbohydrate and protein when metabolized each yield approximately 4 calories per gram. This fact is probably the major reason for the considerable current interest in fat emulsions for intravenous use in humans. Five per cent dextrose in water supplies 200 calories per liter. The most potent amino acid preparation available, "Amigen-800," contains ethyl alcohol and levelose in addition to the amino acids, and supplies 800 calories per liter. The fat emulsion preparation to be discussed supplies 1,420 calories per liter. Therefore, if a suitable preparation can be obtained, fat emulsions make it possible to supply the patient's metabolic needs for calories without excessive water-loading.

Many problems have been encountered in the attempts to obtain a fat emulsion for intravenous use. First, fat differs from carbohydrates or amino acids in that it is insoluble in water; thus a stable finely divided emulsion must be made. The question as to which emulsifying agent will work best has not been fully answered as yet. Some emulsions use purified phosphatides from soybeans, others use various synthetic emulsifiers such as the Pluronics, while still other emulsions contain both types of emulsifiers.

Another problem has been the instability of the emulsion to extremes of temperature. Several emulsions which seemed promising at room temperature did not withstand autoclaving. Coconut oil emulsions which are tolerated very well by patients have had to be discarded because cooling to about 45° F. breaks the emulsion. Temperatures in this range are often encountered during shipment.

A third problem is the physical and chemical stability of the fat emulsion during prolonged storage. Most of the emulsions now being used by other investigators are prepared by homogenizing the oil, emulsifier and dextrose in water at high pressure. Emulsions prepared in this way are reported to be well tolerated when relatively fresh but must be refrigerated to be stored any length of time.[1] Thinking that hydrolysis of the components may play a role in this physical and chemical deterioration, Zilversmit[2] has devised an anhydrous fat emulsion concentrate. The concentrated pre-mix is made by first making a syrup of glycerol and phosphatide in a Waring blender and secondly adding a suitable oil to this syrup in a colloid mill. The whole procedure is carried out at atmospheric pressure and room temperature. The concentrate is diluted to final volume with 5 per cent dextrose in water at the time of administration. This concentrate is stable, physically and chemically, for at least a year when stored at room temperature. It withstands autoclaving well and can be frozen without breaking the emulsion.

After extensive animal studies, clinical trials of this emulsion were started about three years ago. About 1,200 infusions have been given in this period. Our early trials were attended by a rather high rate of reactions, but by changing from sesame oil to coconut oil, by giving the infusion at no more than 20 grams of fat per hour, and by making sure that the emulsion contained few if any droplets over 4 microns in size, a reasonable rate of reaction was attained. However, one reaction infrequently observed was sufficiently disturbing to make the formula unacceptable.

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This was gross hemoglobinuria. This hemoglobinuria is usually observed only in the first voiding after the infusion, does not alter the hematocrit demonstrably and apparently does not damage the kidneys.

In an effort to determine which component of the emulsion was responsible for the hemoglobinuria, infusions of phosphatide in 5% dextrose in water and, also, infusions of glycerol in 5% dextrose in water were given. There were no reactions of any kind to the phosphatide infusions. When glycerol was given in 12.6% solution—the same concentration as in the fat emulsion—gross hemoglobinuria was observed. Infusions containing 6.3% glycerol did not produce hemoglobinuria. Thus a new emulsion formula was tried using the lower glycerol concentration.[3] This was successful in preventing hemoglobinuria, but was an unsatisfactory formula in that it was difficult to attain a satisfactory particle size during preparation and the physical stability on storage was inferior to previous formulae. Further, the cottonseed oil used in the formula gave more reactions than had the coconut oil used previously.

The formula which finally evolved from these studies has been used successfully for the past 11 months and is shown in table 1. An intermediate concentration of glycerol is present. Safflower oil is a very unsaturated oil and thus gives an emulsion which can be frozen without "breaking" the emulsion. It is commercially available in this country in a high state of purity and appears to be tolerated very well by human subjects. The reactions to the current emulsion formula are shown in tables 2 and 3.

Some reactions are sufficiently serious and potentially harmful that infusion would be precluded if one could anticipate their occurrence. On the other hand there are other reactions which are mild and though annoying do not preclude giving the infusion, since the benefit to be derived from the fat far outweighs any possible deleterious effects of a mild reaction. A retrospective classification is used therefore: the preclusive reactions are called "reactions," whereas the mild, nonpreclusive reactions are called "side-effects" to distinguish them from the preclusive reactions. Two instances of hemoglobinuria have been observed—both with the same batch of fat. Since it has not occurred at all with eight other batches made by this formula it may be that the glycerol content of the batch in question was somewhat above the 8% level. It should be noted that the reaction rate in the last 215 infusions is 3 per cent. These infusions were from four lots of emulsion which were made in the full scale production plant whereas the previous lots had been made on a laboratory scale. This data is suggestive that the emulsion of the production plant is a better emulsion than the experimental laboratory emulsion. This may be related to the uniformly minute particle size attainable by the large scale production methods.

Whereas the acute studies of reaction-rate are essential in finding a fat-emulsion formula which can be given safely to humans, once such a formula is found attention must be given to the effect of multiple infusions over

TABLE 1

The Zilversmit-Abbott fat emulsion concentrate unit when diluted to 500 ml. with 5% Dextrose in water contains:

		Calories per 500 ml.
Safflower oil	10 %w./v.	450
Glycerol	8 %	160
Phosphatide	.5%	20
Dextrose	4 %	80
		710

TABLE 2

REACTIONS TO ZILVERSMIT-ABBOTT FAT EMULSION

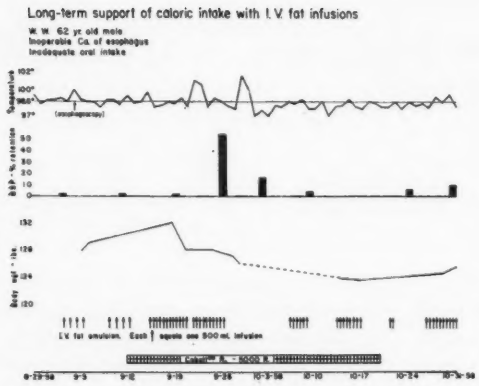
Chill—onset during infusion	7
—onset after infusion	19
Hemoglobinuria	2
Back-pain, dyspnea	1
	29
29 reactions in 474 infusions (6 in last 215 infusions)	6% of infusions (3%)
28 of 251 patients reacted (one patient had 2 reactions)	11% of patients

TABLE 3

"SIDE-EFFECTS" FROM ZILVERSMIT-ABBOTT FAT EMULSION

Temperature elevation	11
Chilly sensations	7
Back-pain, mild	4
Asthma	1
Pruritus	1
Headache	1
	26
26 in 474 infusions	5% of infusions
26 in 251 patients	9% of patients

FIG. 1


Long-term support of caloric intake with I.V. fat infusions
W. W. 62 yr. old male
Inoperable Ca. of esophagus
Inadequate oral intake
Temperature
BSP - % retention
Body wgt - lbs.
I.V. fat emulsion. Each ▮ equals one 500 ml. infusion

a prolonged period. If intravenous fat is to be of significant clinical value, it must have therapeutic value for prolonged support of caloric intake without significant deleterious effects. There is some evidence that harmful effects may accrue on prolonged therapy.[1,4-6] Some investigators are finding that reversible changes in the clotting mechanism occur and that there is also temporary impairment of hepatic function.

We are now engaged in such a long-term study at the University of Tennessee and have suggestive, though not clear-cut evidence that our emulsion causes the same changes as had been observed with emulsion prepared by the homogenization technic. Figure 1 presents the significant findings in a patient who received 56 units of fat emulsion over a 2 month period. This man had lost 36 pounds in the 2 months immediately prior to hospital admission. During the 2 month hospitalization, his net weight loss has been but 3 pounds. It is believed that the 40,000 calories supplied by the fat emulsion is in large part responsible since his oral intake during this period has been grossly inadequate.

Though this patient has derived a great deal of benefit from the fat infusions, he may demonstrate some of the deleterious effects of prolonged infusions. During the latter part of September, he was febrile on two occasions, lost weight, and had a 54% BSP. retention. At the time of this abnormal test he had received 28 units of fat emulsion. However, he had been receiving cobalt-60 therapy for several days. It is impossible to know whether the radiation or the fat caused the observed upset. After subsidence of these symptoms, the fat infusions were reinstituted. Twenty-eight units (the same number as before) have been given without reproducing his symptoms. Infusions are continuing since he still is not able to maintain an adequate caloric intake by mouth.

Summary

Clinical experiences with a new type of fat emulsion for intravenous use are described. Acute toxicity studies reveal that a formula has been achieved which is well tolerated by hospital patients. The value of this fat emulsion for the long-term support of caloric intake is now being investigated.

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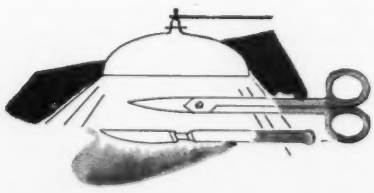

Partnership Practice of Obstetrics in the South*

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This is a most enlightening study of the acceptance of a partnership by patients, as well as the preference for it by members of the profession in one of the specialties.

THE ROUND-THE-CLOCK, day in and day out, nature of obstetrics poses many problems to the practitioner of the specialty. No man can, in all honesty, promise to deliver any given patient at an undetermined time 6 months in the future. So, first, the obstetrician has an ever present obligation to provide an available and acceptable substitute for his patient.

Part of the satisfaction of obstetrics is in the happiness brought by helping others build a family. And yet the unremitting pressure of the practice of obstetrics often robs him of an adequate family life, both by making scheduled family activities impossible and by creating a chronic state of fatigue. That obstetricians have one of the shortest life expectancies of any occupational group is well known.

The classic pattern of practice has been to curtail obstetrics when the pressure becomes too great, limiting work to gynecology, or to retire at an early age. The expression, "obstetrics is a young man's field," is often heard. This robs the profession of many older men of experience, a loss not to be taken lightly.

Many forms of association and partnership have been tried in an effort to alleviate these problems. A survey of the methods in use in the South today is the purpose of this paper.

Fifty-seven per cent of obstetricians practicing in the South are in some form of partnership, and another 27% say that they are planning a partnership or would like to. Such are the findings of a survey of 771 answers to questionnaires sent to 1,024 obstetricians.

*Read before the Section on Obstetrics, Southern Medical Association, Fifty-Second Annual Meeting, New Orleans, La., November 3-6, 1958.

Method of Study

A questionnaire with a covering letter explaining its purpose and asking for full comments was mailed to 1,024 obstetricians. In order to obtain a fair sample and yet include only men limiting their work to the specialty, it was decided to use the current (1957) Directory of Fellows of the American College of Obstetricians and Gynecologists. This, incidentally, limited the survey to those who had been in training and practice for five or more years. The states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia were included in the survey.

At the time this paper was written, replies had been received from 771 or 75.3 per cent. Of these, 26 were from men who had retired or no longer practiced obstetrics. This left 745 replies to be included in the survey. The interest in this subject is evident since 60% of those answering also sent comments as extensive as two typed pages. About half also requested a copy of the results of the survey.

One respondent objected to the brevity of the questionnaire and the validity of the study on this basis. This was considered in preparing the questionnaire, but it was decided that the most desirable form would have been too extensive to have expected a high percentage of replies. It was elected to settle for a shorter form and to depend, in part, on comments returned with it. There is therefore much room left for further investigation. No specific study was made as to age, length of time in partnership or to number of men in each partnership.

Definitions

Since quite a diversity of partnerships was encountered, it is necessary to have some definitions. For the purposes of this study we use the following definitions:

Complete partnership. Two or more obstetricians working together, who see patients on alternate prenatal visits, alternate night work and weekends, and share total net income in a prearranged manner.

Incomplete partnership. Two or more obstetricians who work together, but who do not alternate night work and prenatal visits, but who do share net income.

Association. Two or more obstetricians working together who may share patient responsibility, but who share only office expenses.

Looser forms of association, such as "covering for each other," are not included in any of these categories.

Results of Survey

Of the 745 obstetricians, 214 or 28.8% of the study group indicated that they practiced in full partnership (Table 1). They alternated prenatal visits, alternated night work and weekends, and divided the total income in a prearranged manner. Where it could be determined from comments made, this group, as well as all others, had more or less separate gynecologic practices, though they freely consulted, assisted and generally made hospital rounds on each other's patients.

An additional 5 men (0.7%) had complete partnership as defined above except that they did not divide income from the gynecologic portion of their practice.

One hundred and seventy-six or 23.5% practiced in an incomplete partnership. Though they shared total income and often alternated prenatal visits, they covered the full practice either only when the partner was out of town (46 or 6%), or only on days out of the office and weekends (130 or 17.5%).

Thirty-four or 4.6% of the study group were, by our definition, in association. They shared expenses only, even though half of these associations cover the practice on weekends and days out of office. All of this group had at least some provision for both associates to meet all patients prenatally.

Three hundred and sixteen, or 42.4%, of the study group were not in partnership practice. Of this group 85 (11.4%) had previously practiced in partnership and 53 of these expressed a desire to do so again.

Two hundred and thirty-one (31%) had never practiced in a partnership, but 145 of these expressed an intention or an interest in doing so.

Reasons for Discontinuing Partnership

Of the 85 respondents who had previously

TABLE 1

OBSTETRICIANS IN PARTNERSHIP OR ASSOCIATION

	Share Total Income		*Share O.B. Income Only*		*Share Expense Only*	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
I Alternate night calls and weekends						
a. Rotate prenatal visits	214	28.8	5	0.7	0	0
b. Meet prenatal patients	0	0	0	0	0	0
c. Sees patient when partner absent	0	0	0	0	0	0
II Cover when out of town and weekends						
a. Rotate prenatal visits	42	5.6	0	0	0	0
b. Meet prenatal patients	22	3.0	0	0	11	1.5
c. Sees patient when partner absent	66	8.9	0	0	6	0.8
III Cover when out of town only						
a. Rotate prenatal visits	12	1.5	0	0	0	0
b. Meet prenatal patients	0	0	0	0	0	0
c. Sees patient when partner absent	34	4.5	0	0	17	2.3
	390	52.3	5	0.7	34	4.6

Total 429 or 57.6% of Study Group

OBSTETRICIANS NOT NOW IN PARTNERSHIP OR ASSOCIATION

	Planning or Interested in Partnership		*No Desire for Partnership*		*Total*	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
Never in partnership	145	19.5	86	11.5	231	31.0
Previously in partnership	53	7.1	32	4.3	85	11.4
Total	198	26.6	118	15.8	316	42.4

practiced in partnership, 80 listed their reasons for discontinuing it (Table 2). The reasons given varied from "wrong choice of partner" (by 22) to "partner ran around with a woman in the office" (by 1). Fifty-three of this group expressed a desire to re-enter partnership practice.

Estimate of Patient Acceptance

One question asked the obstetrician was to estimate the percentage of patients accepting his form of partnership arrangement (Table 3). Admittedly only a personal estimate could be made. If any conclusion can be drawn from this, it would be that patients accept complete partnership as defined here somewhat better than they do incomplete partnership. Or, perhaps more obstetricians in complete partnership are optimists.

Most men in a complete partnership admitted that they encountered occasional patients who did not like "two or more doctors." Often these patients are advised to go elsewhere, or the partnership actually arranges for their care by a solo obstetrician. This probably is the reason for many men in this category saying they had 100% patient acceptance. If the patient did not readily accept the plan she was not accepted for care. Throughout the comments received was the estimate that for every patient so lost there were others attracted by the fact that complete coverage is inherent in a complete partnership, thus affording a sense of security to the patient. Repeatedly the observation was made that if prenatal visits are alternated, by the time delivery comes the patient rarely has a real preference as to which obstetrician is with her in labor or delivery.

Discussion

A major ingredient of the patient's acceptance of the partnership is that the partners accept each other. Professional competence, friendly, conscientious interest in the patient's welfare, and a genuine liking of obstetrics must be present in all partners. If one can respect and trust his partner it is easy to sell the patients on him.

The opinion that the intelligent, adjusted obstetrical patient readily accepts the advantages of complete partnership was expressed many ways. "Those who object are ones in need of one person on whom to project their anxieties." "Patients not accepting are always those most demanding of time—the neurotic dependent who leans so heavily on her doctor that he doesn't have time for others." "Patients who do not accept are those who do not accept personal responsibility for themselves, including financial responsibility."

More common than lack of the patient's acceptance of a partnership is misunderstanding by her family. This certainly has been our experience. To be successful an effort must be made to tell the patient's family, directly or through the patient, of the security afforded by the partnership.

Several responding obstetricians gave the plea that an effort be made by organized medicine, through the press and other media, to educate people regarding the desirability of partnership practice and the benefits accruing to both the patient and the obstetrician. Comments received indicated that a two-man partnership is most common, though as many as six in a complete partnership were encountered. Despite this, general comment would suggest that the majority of men, whether in partnership or not, felt that three men constituted the ideal number. Several of the obstetric partnerships functioned as parts of a heterogeneous group, but the incidence of this could not be determined.

Size of the community did not seem to be a

TABLE 2

REASONS FOR DISCONTINUING PARTNERSHIP

Wrong choice of partners	22
Unsatisfactory profit sharing	16
Retirement or death	13
Younger man felt he remained only assistant	10
Too great an age difference	6
Inequality of work done	4
Lack of patient's acceptance	3
Miscellaneous	6
No reason given	5
Total previously in partnership (53 wish to re-enter partnership)	85

TABLE 3

OBSTETRICIANS' ESTIMATE OF PER CENT OF PATIENTS ACCEPTING PARTNERSHIP

Per Cent of Patients Accepting Partnership	*Complete Partners*	*Incomplete Partners*
98% Plus	55.0%	37.0%
95-98%	16.5%	25.2%
90-95%	21.0%	22.2%
80-90%	7.0%	10.2%
Less than 80%	0.5%	5.4%

significant factor in the success of complete partnership. One partnership in a small town marvelled at the degree of patient acceptance and wondered if patients would be less eager for it if there were a local surplus of obstetricians. It would seem that practice in smaller towns having hospitals with no house staff would make partnership practice more desirable. Yet some of the larger and very successful partnerships were found in some of the largest cities where a wide choice of obstetricians is offered.

It was significant that, generally, the looser the association the more was the chance of disharmony. One man expressed this by saying, "Partnership should be complete in all respects or just an informal association. Anything between these extremes just leads to trouble."

An example of this is given by some who have tried complete partnership as regards obstetrics, but who maintained financially separate gynecologic practices. Whose patient is the obstetric patient who later becomes a gynecologic patient? Competition for patients results, which nullifies some of the advantages. The sharing of only expenses of practice can similarly pose the problem of competition.

"My young associate was trying to take over my wealthy obstetric patients," one man said. This was countered by the young associate's remarks, "My older partner continued to deliver those he wanted to, took the better class of patients because of who they were." Such problems were common in loose associations and incomplete partnerships. Where neither physician is committed to render complete personal service to any particular patient, but each seeks and requires the patient's acceptance of the other, this is minimized if not eliminated. The practicing together of "big shots" and "flunkies" cannot result in harmony.

It is difficult to distill into a paper the interesting comments of the 442 obstetricians who gave their opinions of partnership practice. A description of the typical harmonious partnership encountered would be about as follows:

There would be either two or three competent men who respect each other, with not too great a disparity in age and none with a compelling urge to make a fortune from practice. Their personalities might differ markedly, but they should cooperate to standardize routine procedures so as to minimize confusion in the patient. None would be so jealous of his patient relationship as to object to her being cared for by another, or be so egocentered as to think that only he could properly care for a patient.

Typically the new obstetric patient would come to the partner of her choice initially, but on that visit would be told that her obstetric care would be handled by the partnership. In so far as possible she would at that time meet the other partner and thereafter alternate prenatal visits. She would be told of the advantages of partnership care, particularly of the security afforded by two or three competent obstetricians who know well both her and her problems, and of whom one would always be available. During the 6 months or so of prenatal visits the patient might develop a preference for the personality of one of "her doctors," but that preference is often transitory. Assurance of competent care by a rested obstetrician overcomes it. The constant availability of free consultation is mentioned. Few women resist "two for the price of one" in anything. Often a written explanation of the set-up is given the patient to help her in explaining it to her family.

This typical partnership would keep somewhat more detailed records than the average solo obstetrician and spend considerable time discussing their patients so each is fully advised. Instead of being a disadvantage this can increase their enjoyment of practice. They cannot both attend the same meeting, nor can they take a vacation together. But when one is away he can relax in the knowledge that his patients are not only being well cared for, but have already accepted his absence. Additionally, income is not greatly reduced by his absence. In return, when he is on call to work he must always be easily available and his telephone always answered.

In this partnership nights are alternated as are weekends and with rare exceptions, the man working handles all deliveries. Exceptions are usually limited to physicians' wives, who are free to make their own selection, and the occasional patient who because of time-consuming emotional problems has been seen

mostly by one partner. All partnerships report that the more exceptions made to the alternation of night work, the more problems are created. Several stated that patients previously delivered by one of the partners prior to formation of the partnership posed a problem in this regard; while others reported that these accepted the set-up when it was explained, or at least after a few visits to the other partner.

When one obstetrician has followed a patient through most of labor he usually is able to continue through delivery; though, if the labor is difficult or complicated, the patient is seen by the other partner(s) during the course of it. This ready consultation may not benefit the patient, but it soothes the waiting family and the attending obstetrician.

If the practice is very large one partner is generally at the hospital. It is easier to be content in spending a night with patients in labor with the assurance of rest the next night. It encourages more time with patients in labor and less dependence on nursing and house staffs. Patients and their families also appreciate the absence of a mad dash to the delivery room.

In this typical partnership hospital rounds are more or less rotated, though commonly all patients are seen by all partners sometime during the day. The postpartum patient returns to the partner of her choice for follow-up care, but usually when she calls for an appointment she is more specific about the date and time she desires than about which partner she wishes to see. She feels that each is her doctor.

The infertile or gynecologic patients are seen by the physician of their choice throughout, with the knowledge that his partner is available at any time he is not. Several partnerships reported that their gynecologic practices increased after they instituted complete partnership. None complained of a decrease in income.

Net income of this typical partnership is divided by a prearranged formula, either evenly or with that goal in sight. In contrast to other forms of association little complaint of division of income is found in the complete partnership. In the knowledge that over a period of time work done evens out, there is no record made of which partner does what part of the work. Such matters as compensation during protracted illness, death and dissolution, provision for growth and perpetuation of the partnership, and protection against liability are covered in a formal partnership agreement drawn with the aid of legal counsel. Men, when working well together, have no need for a written agreement, and many have none; but death, at the least, does occur and an agreement before it is needed will prevent problems.

The main ingredients for success of such a partnership are unanimity of spirit, generous cooperation with the aim of better service to patients, and a determination to make the partnership work. As one man said, after 3 years of solo practice he entered complete partnership with a determination to make it work, or "give up and go home to father." Six years later his is working well.

That not all obstetricians can practice in partnership is obvious. Such a man is the one who commented, "I simply could not share my relationship with the patient and her family. To me the main attraction of obstetrics is this feeling of oneness with my patients." The very competitive solo obstetrician who thrives on long hours and few vacations would be dissatisfied in sharing his income with another who values an occasional evening with his family or regular vacations. There is also the man who may be very capable, but who does not like his work to be under the close scrutiny imposed by a complete partnership. And, finally, there is the obstetrician described by one respondent as, "believing he is God's chosen man," thriving on the adulation of patients and office personnel. This man needs his own pedestal.

Advantages of Complete Partnership.

The advantages of complete partnership in the practice of obstetrics can be summarized as:

1. Providing the patient with a familiar obstetrician at all times.

2. Encouraging a closer attendance to patients in labor.

3. Permitting better adherence to office schedule, allowing more time with patients.

4. Providing constant availability of consultation.

5. Providing constant professional stimulation by the close contact of the partners.

6. Permitting more time for study.

7. Encouraging regular attendance at meetings and regular vacations.

8. Permitting a more adequate family life.

9. Permitting maintenance of better health.

10. Providing financial protection against illness and accident.

11. Reducing overhead expense.

12. Making for a longer life.

13. Encouraging the older practitioner to remain active in obstetrics.

While other forms of practice cover some of these points, only complete partnership covers them all.

Disadvantages of Complete Partnership.

The disadvantages to a complete partnership are as follow:

1. Not suited to the individualist incapable of enjoying teamwork.

2. Requires that each patient be "sold" on all partners by the others.

3. Some loss of individuality with possibly some ego depression.

4. Lessening of close personal rapport with patients.

5. Makes each partner liable for actions of other partners.

6. Requires more detailed records.

7. Requires more time at prenatal visits.

To what extent each of these points is a disadvantage varies with the individual. Whether more detailed records, so that your partner may know just what has transpired when next he sees the patient, is a disadvantage or not is at least debatable. Also it could be said that the extra minute or two spent at prenatal visits to maintain a good rapport with the patient is time well spent. As to the loss of some of the close personal relationship of the obstetrician with his patient, it may be less than that lost in a heavy practice handled alone which results in conflicts of surgery, deliveries and the state of acute and chronic exhaustion which so often burdens the solo obstetrician.

Several men report a changing attitude of patients toward their physician, finding them more willing to trade a little of the "close personal relationship," so often mentioned, for the security of the availability of a partnership, particularly if they think they are getting more competent care by a less fatigued obstetrician.

Summary

One thousand and twenty-four obstetricians in the South were queried as to the form of their practice. Of the 745 in active practice who replied, 28.8% were in a complete partnership as defined here, and a total of 57.6% were in some form of partnership. Of those answering, 84% were either in partnership, planning to enter, or expressed interest in doing so.

From the information amassed, it is concluded that among the varying forms of partnership a complete one, with alternation of prenatal visits and night work and division of net income by a prearranged plan, offers the most satisfaction with no added risk of rejection by the patient. One respondent summed it up by saying that it was the ideal way for a man wanting to give good obstetrical care, stay happy and "live to collect the annuities."

Discussion (Abstract)

Dr. Clarence G. Sutherland, Jackson, Miss. I would like to congratulate Drs. Raulston and O'Neal on the excellent presentation they have given us this morning. Attention has again been called to a "way of life" in the practice of medicine,—namely, one of the various forms of group practice.

Group practice historically is difficult to delineate as to specific time of origin, but apparently has developed concurrently with the development of the specialty concept of medical practice. Reputedly, it is almost entirely a North American concept, and most of the interest in group practice has evolved during the past 75 years.

The Year Book Publishers have recently published a book entitled "The Physician and Group Practice" which presents an excellent discussion of this subject. It represents, to my mind, an attempt on the part of the 35 contributors to present an easily digestible, panoramic view of the most important aspects of group practice. Since it is apparently true that more and more physicians are becoming interested in this type medical practice, this source will be useful in supplying many answers to questions regarding various details of the many different types of associations.

The essayists have given us a most complete discussion of one type of group practice—the partnership—as it is applied to obstetrics and gynecology. To attempt to expand on their discussion would be superfluous. The advantages and disadvantages of such an arrangement have been developed with lucidity, and the pitfalls have been enumerated.

Ego and economics have been properly assigned a major role in considering why some partnerships are not successful.

It has been said that the primary motivation for any form of group practice is one of being able to practice better medicine. Certainly, an analysis of the pros listed by the authors can only agree with this concept. Whether this results directly from such aspects as more time for study and postgraduate education, or indirectly from increased leisure time and relief from many problems encountered by the solo physician, the net result can be the same.

It is probably safe to say that group practice in its many variable forms is here to stay. The day when most physicians were rugged, individualistic, solo practitioners, fulfilling a role of being all things to all people, has most likely disappeared from the scene, not to return in the foreseeable future. If this be true, it is true because it is desirable to a large percentage of practicing physicians and is acceptable to a large percentage of patients. And certainly if these conclusions are valid, there is no area in medical practice that is better suited to such a concept than is found in the practice of obstetrics and gynecology.

HOTEL RESERVATION APPLICATION FORM

FOR 53rd ANNUAL SESSION

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Wringer Injuries of the Upper Extremity: A Clinical, Pathological and Experimental Study*

JOHN P. ADAMS, M.D., and FRANCIS D. FOWLER, M.D.,†
Washington, D. C.

The slight damage to tissues apparent upon inspection soon after injury may be misleading. Prompt treatment and careful observation of the injuries described here are imperative in avoiding serious sequelae.

A "WRINGER INJURY" may be defined as a crushing injury to the upper extremity incurred as the arm passes through the rollers of the wringer of an electric washing machine. We believe the importance of early recognition and proper care of this common injury are not well appreciated.

This paper represents a three year experience (1955 through 1957), at the District of Columbia General Hospital with 137 cases, in which adequate follow-up study on 120 is available. All patients received similar care, namely, hospitalization, triple compression dressings and elevation of the extremity. The cases are divided into two groups, those in which the patient was seen early and those seen late. We consider any patient seen within 24 hours of injury as early. One hundred and eleven patients received early care and 9 received late care, with a time interval between 28 hours and 4 days after injury. There are 112 children and 8 adults in this series. The adults, with one exception, represent a group of young mothers. Of the children, 72 are boys and 40 girls with an average age of 7 years (Table 1).

The following case report of an incident of Volkmann's ischemic contracture subsequent to a wringer injury will emphasize the potential seriousness of this condition.

Case Report. D. C. This four year old negro boy was seen in the emergency room within 12 hours of his initial injury. Physical examination revealed tenderness, swelling and superficial abrasions. He was sent home from the emergency room without treatment.

He was seen subsequently 2 days later and was again sent home. Four days after injury he returned with a badly swollen forearm and hand and complete loss of motor function.

The patient's subsequent course was as follows: A decompression of the antecubital area with inadequate decompression at the site of the origin of the flexor digitorum sublimis was performed. Subsequently there was sloughing of the anterior flexor compartment of the forearm including the overlying skin. Subsequent surgical procedures consisted of excision of the necrotic skin, muscle mass and approximately 6 cm. of necrotic median nerve. The wound then went on to primary healing.

Following this there was loss of sensation of the hand and loss of all muscle function below the elbow. After a neurolysis of the ulnar nerve, ulnar sensation and motor function returned to the hand. Anesthesia over the distribution of the median nerve of the hand and complete loss of function of the long extensors and flexors of the fingers remained. Sensation over the distribution of the median nerve was obtained by transference of the distal superficial radial nerve into the stump of the median. Sensation began to return within 3 months and at the end of one year it was essentially normal. Following return of sensation the biceps brachii was transferred to the flexor digitorum profundi tendons, utilizing a free tendon graft from a long toe extensor. Fair function in the hand is present at this time (Figs. 1, A, B, and C). The function of this transfer is enhanced by a fibrous ankylosis of the wrist in extension.

TABLE 1

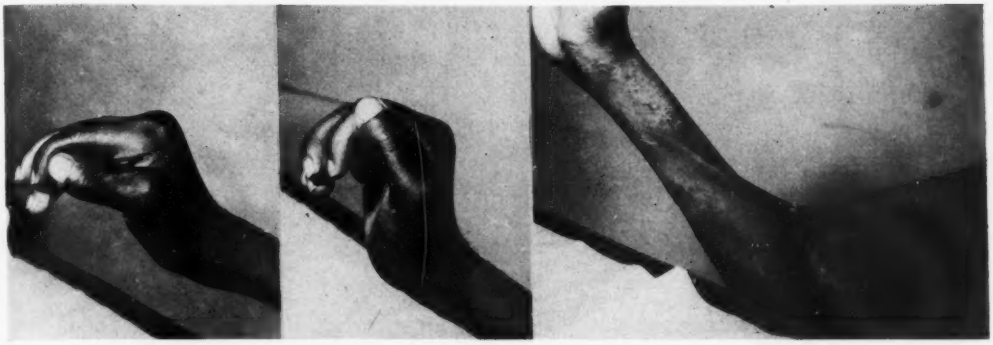
SUMMARY OF CASES STUDIED

Total cases	137
Follow-up	120
Early care	111
Late care	9
Children	112
Adults	8

*Read before the Section on Orthopedic and Traumatic Surgery, Southern Medical Association, Fifty-Second Annual Meeting, New Orleans, La., November 3-6, 1958.

†From the Department of Surgery (Orthopedics), The George Washington University School of Medicine, the Orthopedic Service, District of Columbia General Hospital, and the Mt. Alto Veterans Hospital, Washington, D. C.

FIG. 1



(A) Extension of finger by intrinsic muscles alone. (B) Active finger flexion. (C) Pull of biceps through tendon graft. The wrist position is unchanged throughout flexion and extension.

Review of Literature

The term "wringer arm" was coined by MacCollum[1] in 1938. He advocated measures to reduce edema with early release of pockets of subcutaneous fluid. In 1941, Allen[2] published a two year experience with 107 cases. He noted few injuries as far proximal as the axilla. His emphasis in early therapy was to control the swelling of the extremity. It was Allen's observation that too often a patient reported for immediate care only to be dismissed before the massive swelling began at about 12 hours. Allen observed that when there were no skin lacerations and only massive swelling, functional return of the extremity required a longer interval than when this was not present. Schulz[3] presented 64 cases covering the period from 1935 to 1941. He reported two deaths, one from purpura, the other from septicemia. Hausmann and Everett[4] reviewed 97 cases in 1950. From 1935 to 1941, 45 were treated with methods of that era. These included hot compresses and cold packs, multiple incisions, aspiration, Dakin's solution and irrigations. Fifty-one were treated by the method of immediate application of compression and antibiotics. The care by compression dressings was without question superior in this group of cases. MacCollum,[5] in 1951, reviewed his total experience of 116 cases. He classified these cases according to the degree of trauma sustained. A first group of 70 patients was seen within 12 hours of injury and discharged in 48 hours without scar or loss of function. A second group of 23, also seen within 12 hours, developed swelling and subcutaneous effusion requiring surgical drainage. The only residual changes at discharge were scars from the surgical wounds. A third group of 23 included severe crushing injuries seen from 2 days to 6 months after injury. All of the third group required skin grafts and extensive surgical care. His conclusion was that early therapy, including compression dressings and surgical incision and drainage of subcutaneous fluid collections, would likely prevent late sequelae.

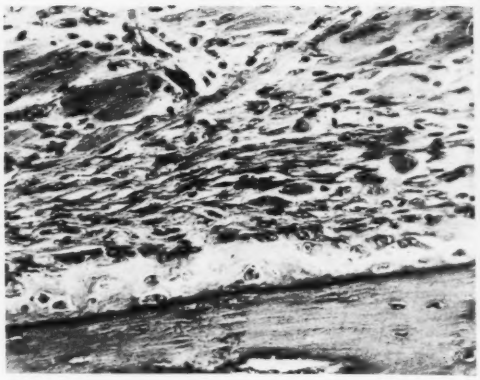
Pathogenesis and Pathology of Wringer Injuries

The changes incident to wringer injuries fall into two major groups. First are those abnormalities directly related to the trauma. In this group will be placed fractures, skin lacerations, and abrasive burns. Some of the changes of this type are probably the result of the victim's efforts to extricate himself from the wringer, or the result of overly zealous extraction efforts by parents or other adults. The second, and potentially more serious change, is indirectly related to the immediate trauma. These are the abnormalities seen after a lapse of a few hours and are manifested principally by swelling of the deeper tissues. With the exception of the one case of Volkmann's contracture there have been no late changes in the skin and subcutaneous tissues in our series. We believe the swelling and pain which come on a few hours after injury are due to initial muscle injury and subsequent cellular and intercellular edema. The degree to which this process can progress is

FIG. 2

Five minutes after injury normal striated muscle fibers with adjacent periosteum and bone are noted.

FIG. 4



At 168 hours organization of the involved area is noted with a proliferation of fibroblastic connective tissue.

illustrated in our case report and formed the stimulus for the following experimental study.

Experimental Wringer Injury

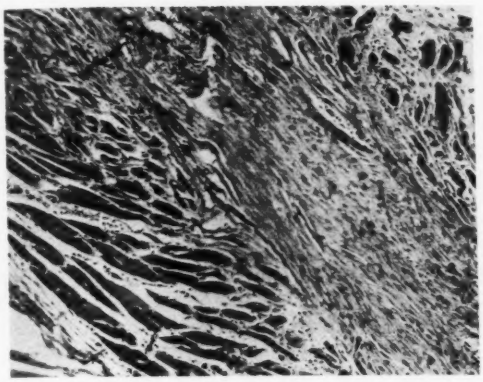
Material. Rats (60 to 80 Gm. Wistar Strain). *Procedure.* With the animals under ether anesthesia, each hind extremity was subjected to crushing roller injury in a hand-operated wringer for 60 seconds. After 60 seconds the extremity was removed by reversing the rollers. All injured extremities revealed severe edema in about 24 hours. The earliest recorded swelling was after 3 hours. The average time in 17 rats was 10 hours. This degree of swelling was defined as "an extremity of approximately twice its normal size and apparently paralyzed." From the time of the injury most rats could use their hind extremities to move if they were forced to do so. All were unable to climb. By about 24 hours the swollen extremities were held in extension at the hip and knee and the animal preferred to lie quietly. If forced to walk, he dragged his hind extremities. It was noted that in 72 to 96 hours after the injury all the animals required more fluids than normal. After 96 hours all the animals could use their hind extremities in walking although reluctantly. At 186 hours the animals would climb and walk freely. *Histologic changes.* The findings were as follow: No histologic changes are noted up to 24 hours (Fig. 2). At the end of 24 hours hemorrhage and edema are noted between the muscle fibers and in the subperiosteal region (Fig. 3). There is a large collection of inflammatory cells, including polymorphonuclear neutrophils. Sections at 168 hours show an increase in this inflammatory pattern and connective tissue proliferation (Fig. 4). These pathologic changes are of a patchy nature, usually near the bone and in no instance show a generalized involvement of all muscles. Necrosis of the skin was not observed (Fig. 5).

FIG. 3

At 24 hours a pronounced vascular congestion, characterized by hemorrhage and edema between individual muscle fibers, is seen. A few necrotic muscle fibers are present. Polymorphonuclear leukocytes are seen throughout this section.

We believe that on the basis of these experimental findings the late manifestations in wringer injuries are due to a vicious cycle of muscle and soft tissue injuries and edema with subsequent venous and lymphatic obstruction, followed by necrosis of muscle fibers, stimulation of fibrous tissue and ultimately fibrosis and contracture if the changes are extensive.

FIG. 5



At 380 hours an area of fibrous tissue has replaced the injured muscle. Giant cells are seen continuing the organization of necrotic debris. In another area rather normal muscle fibers are noted.

Direct trauma to the arterial circulation may play a part in the production of this syndrome. Our findings are similar to the experimental changes produced by venous obstruction in the monumental experiments of Brooks[6] and of Harman and Gwinn.[7]

Case Analysis

The most prominent presenting physical finding in 108 cases was edema of the extremity that varied from mild swelling to moderate pitting edema. Abrasions of the severity of second degree burns were seen in 22 patients. Fifteen patients had lacerations when first examined. Seven children and adults had partial avulsions of full thickness skin flaps. Fractures were infrequent and presented no particular problem. An unusual finding in one adult was a lateral subluxation of the extensor tendon to the third finger. Two patients presented themselves with large blisters; one involved the dorsum of the wrist and the other, the upper third of the volar surface of the forearm. Two patients gave only a history of a wringer injury and were without positive physical findings (Table 2).

The most common location of a roller burn was at the elbow. Eleven patients suffered severe second degree burns of the skin in the antecubital space and an additional three, the upper third of the volar surface of the forearm. Of these 14 cases, 7 required a split thickness skin graft. The axilla was involved in 5 severe burns. The incidence of axillary burns was 25% as compared to 19.7% for antecubital burns. One skin graft was required in the axilla (Table 3).

There were 15 lacerations. Ten involved the web spaces. Seven of these were found between the thumb and index finger. A large extensive and irregular laceration was not unusual over the protuberant thenar eminence, being noted on three occasions. Small lacerations of the palm and dorsum of the wrist were of no consequence. All were successfully treated by primary suture.

An avulsion of the full thickness of skin was observed seven times. This occurred three times at the elbow and three times over the thenar eminence and once over the dorsum of the hand. All healed except in one case.

Five fractures occurred in four patients and did not influence the course or outcome of the soft tissue injury. Two greenstick fractures of the distal radius were observed. One was associated with a fracture at the base of the fifth metacarpal. An interesting fracture of the tip of the coronoid process made us wonder if this was not an avulsion resulting from a sud-

TABLE 2

INITIAL INJURY 120 CASES

Edema (mild to moderate)	108
Laceration	15
Second degree burn (severe abrasion of skin)	22
Avulsion (full thickness of avulsion of skin)	7
Fracture	5
Ulnar nerve palsy	1
Subluxation extensor tendon at M.P. joint	1
Blister	2
No findings	2

TABLE 3

LOCATION OF VARIOUS INJURIES

Lacerations (15)	
Thumb web	7
Other webs	3
Thenar eminence	3
Dorsum wrist	1
Palm	1
Fractures (5)	
Coronoid process	1
Greenstick radius	2
Radius and ulnar transverse	1
Base fifth M.C.	1
Second Degree Burns (22)	
Anterior medial elbow	11
Anterior lateral elbow	1
Axilla	5
Dorsum wrist	1
Thenar eminence	1
Upper third volar forearm	3
Avulsion (7)	
Anterior elbow	3
Dorsum hand	1
Thenar eminence	3

TABLE 4

RELATIONSHIP OF THE LEVEL OF INJURY TO THE TIME OF HOSPITALIZATION AND NUMBER OF OPERATIVE PROCEDURES REQUIRED

	Number of Cases	*Average Hospitalization*	*Number of Operative Procedures*
Proximal injury to wrist	29	5.6	1
Proximal injury to elbow	71	7.2	18
Proximal injury to axilla	20	11.8	2

den tightening of the brachialis tendon as the roller passed over the elbow and up the arm. An undisplaced transverse fracture of the radius and ulna required a closed reduction due to refracture three months later.

An analysis of our cases revealed that among the group of children who received an axillary injury, the average age was 4 years and 2 months. Those who received an injury to the hand or wrist averaged 13 years and 8 months. This would be consistent with the larger extremity causing the rollers to be automatically released. The modern washer wringer has a release mechanism which, when tripped, causes the rollers to separate. The group that received an injury with a proximal limit at the elbow averaged 6 years. It has been our experience that the elbow injury was over twice as frequent as a wrist injury and three times as common as an axillary injury. The rollers on the upper third of the forearm and at the antecubital space caused injury which required 18 surgical procedures as compared with a total of three procedures after injuries to the wrist and axilla. The axillary injuries required an average of 11.8 days of hospitalization, the wrist 5.6 days, and the elbow 7.2 days (Table 4).

Treatment

The care of this injury at the District of Columbia General Hospital is given by the Orthopedic Service. The general principles of care have been suggested by others although we have adapted them to our hospital with several refinements (Table 5). All patients are admitted to the hospital. In the admitting office an orthopedic resident evaluates the status of the limb. The extremity is washed with surgical soap and sterile water. Lacerations when present are sutured. A compression dressing consisting of three layers of sheet wadding and elastic bandage is applied in the emergency room. The compression dressing extends from the finger tips to the axilla, the fingers being wrapped individually. The extremity is suspended for 72 hours. The dressings are then removed and the extremity re-evaluated. Roentgenograms are taken to determine possible bone injury. The extremity is rewrapped. Plans for future care are formulated at this time. Discharge is usually arranged on the fifth hospital day for those cases in which progress is satisfactory. The patients are discharged wearing their compression dressings. All patients are observed weekly after discharge until maximal improvement is reached.

TABLE 5

RECOMMENDED CARE FOR WRINGER ARM INJURY

1. Admission to the hospital.
2. Evaluation in admitting office of extent of injury.
3. Surgical preparation; suture of lacerations; sterile compression dressings of three layers of sheet wadding and Ace bandage from finger tips to axilla.
4. Suspension of the extremity for 72 hours.
5. At 72 hours, roentgenograms; reapplication of compression dressings; plans to treat complications, i.e., skin graft, fractures.
6. Discharge on fifth day for uncomplicated cases.
7. Weekly observation until maximal improvement reached.

Delayed Care

A review of the 9 patients who presented themselves at intervals of 28 hours to 4 days revealed several interesting findings. One child was sent home from the emergency room because the potential seriousness of his injury was unrecognized. In another case a private physician cared for the patient's injury with moist soaks, while in still another the physician treated the injury as cellulitis. One child arrived at the admitting office within 15 minutes of injury; the father became impatient and left with the child. In two other cases frank parental neglect caused a delay of care (Table 6).

Of those who received inadequate early care, all were children averaging 5 years and 6 months; 6 were boys, 3, girls. In 4 of the 9 cases complications developed, and in two a poor functional result occurred.

Of the 4 cases in which complications developed, one patient required a split thickness

TABLE 6

REASONS FOR DELAYED CARE (OVER 24 HOURS)

1. Seriousness of injury not recognized in emergency room	1
2. Failure by private physician to recognize nature of injury	1
3. One case treated by pediatrician as cellulitis	1
4. Arrived in admitting office within 15 minutes of accident but left because of impatience of parent	1
5. Parental neglect	2

graft to a severe burn of the upper third of the forearm. A second presented with an ulnar nerve palsy and burn to the posterior axillary wall. A successful return of ulnar function was obtained with splinting and physical therapy. The burn healed without requiring an operation. A third patient showed an extensive burn with a slough on the upper third of the forearm and antecubital space. Infection followed and multiple skin grafts were necessary. This resulted in a range of elbow motion of less than 35 degrees. The fourth child developed a Volkmann's ischemic contracture (Table 7).

Operative treatment of these crushing injuries was limited to 19 cases. Split thickness skin grafts were used to cover skin defects on 17 occasions. A Z-plasty release of a contracture at the elbow was required in one case. At no time was incision and drainage of subcutaneous collections of fluid carried out. The patient with the Volkmann's contracture required multiple surgical procedures.

Results

A normally functioning extremity was obtained in 116 of the 120 cases. Two end results were considered fair. This designation was given because in the face of an acceptable functional result a 28 year old housewife complained of stiffness of all the interphalangeal joints at the end of one year. In another case, of a 10 year old girl, the result was considered only fair because of atrophy of the extensor muscles of the right forearm producing weakness of wrist and finger extension. The Volkmann's contracture was considered a poor result despite reconstructive measures. In the case with the flexion contracture at the elbow, the result must be considered poor, although the patient was lost to follow-up care at 8 months (Table 8).

Discussion

A wringer injury to the upper extremity is a frequent home accident in children and not uncommon in adults. The most common early clinical signs of slight tenderness and swelling may be misleading as to the actual severity of the trauma, as was illustrated by the case report of a Volkmann's ischemic contracture, developing after such an injury.

The more serious complications that may follow a wringer injury are thought to be due to trauma to soft tissue, especially of the muscles and neighboring structures, with secondary edema that may ultimately lead to venous obstruction. The experimental material shown illustrates the delay in the appearance of histologic abnormalities, the earliest being seen at 24 hours.

The recommended treatment consisting of hospitalization, promptly applied compression dressings, and close observation has given a normally functioning extremity in 116 of 120 cases.

TABLE 7

TOTAL OPERATIVE PROCEDURES

Split thickness graft	17
Z-plasty	1
Volkmann's Syndrome	
Debridement of forearm flexors and median nerve	
Transfer of superficial radial nerve into stump of median nerve	
Biceps muscle-tendon graft into profundi tendons[1,4,6,7]	

TABLE 8

FUNCTIONAL RESULTS

Excellent	116	
Fair	2	(1) Stiffness of fingers—one year (2) Atrophy of extensors in forearm—one year
Poor	2	(1) Volkmann's ischemic contracture, right arm (2) Flexion contracture of left elbow (Lost to follow-up)

Summary

This paper has presented a series of 120 wringer injuries of the upper extremity. The pathogenesis and pathology have been correlated with experimental findings in simulated wringer injuries in young rats. An analysis of these cases has emphasized the importance of early recognition and adequate care.

The results obtained offer substantial proof of the efficacy of the outlined therapy.

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Discussion (Abstract)

Dr. Thomas F. Hudgins, Houston, Tex. I would like to compliment Drs. Adams and Fowler on their excellent presentation and their methods of treatment of this injury which is too frequently undertreated.

It is difficult to convince a parent, especially one from the lower socio-economic group in which wringer injuries are usually seen, of the importance of adequate early and continued treatment of an extremity which has little or no visible sign of injury when it is first examined. *But,* it is our duty to follow a plan of treatment in all these cases, and thereby possibly "overtreat" a certain percentage of these patients to prevent the tragic results which one or two per cent will get without this treatment.

Concerning the case shown with the Volkmann's contracture, there seems to be no argument about the fact that venous obstruction, which in wringer injuries is secondary to swelling, is its major cause. This swelling can be greatly decreased by early, properly applied pressure dressings. These, and the circulatory status of the hand must be frequently checked, and the tension of the dressing adjusted to the swelling. Despite advertisements, elastic bandages do not stretch significantly as tissue beneath them swells. Too many of us, especially we orthopedists, apply them far too tightly. They should just be "laid on."

The essayists' approach to the loss of the most important sensory nerve of the hand, the median, once the most important motor nerve, the ulnar, had been restored, by means of a radial to median graft, is new to me and, I believe, an excellent move in this and similar cases. The biceps to flexor digitorum profundus tendon transplant likewise was very good in this case.

I believe the greater incidence of severe injuries about the elbow is due not only to its increased diameter and its decreased padding, but also to the fact that the tissues here are more intimately fixed to structures beneath them. This parallels the fact that it was noted in rats that the most seriously damaged muscle was that intimately attached to bone, and therefore crushed against it when it could not escape by moving from between the bone and the crushing roller. The authors saw no pockets of subcutaneous fluid, such as were reported in other series, nor will we see many, but those seen must be evacuated. And if the compression is necessary, it must be very adequate, nerve tissue especially is so easily and irreversibly damaged by pressure.

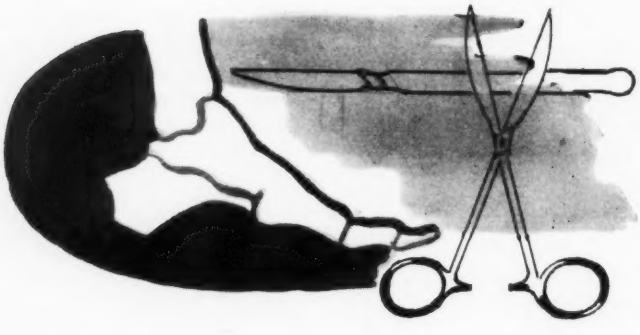
If, in industrial roller injuries which are usually more severe, thenar muscles should be detached from their origin, and if one is not absolutely positive of the integrity of their blood supply, they should be removed. Our failure to do so last year in Houston was, I believe, a contributing factor to the development of gas gangrene in a hand that was so injured.

Lastly, I would like to hear Dr. Fowler discuss the use of hyaluronidase and trypsin compounds in these injuries.

Thank you for allowing me to discuss this most excellent paper.

Dr. Adams (Closing). Dr. Hudgins has asked about the use of hyaluronidase and trypsin. Both preparations have been used on occasion, but no opinion as to their efficacy can be given. In selected cases hyaluronidase injected immediately into the affected extremity is indicated. Parenteral trypsin would seem to be best indicated in the late resolution of the process.

I agree with Dr. Hudgins that an elastic bandage can be wrapped too tightly. Several of our paitents had pain which was relieved simply by loosening the bandage.



Possibilities of Supervoltage Roentgenotherapy in the Management of Cancer of the Breast*

GILBERT H. FLETCHER, M.D., and
EDGAR C. WHITE, M.D.,† *Houston, Tex.*

With a better understanding of the routes of metastatic spread in carcinoma of the breast and the development of supervoltage roentgenotherapy, a re-evaluation of independent and coordinated use of surgery and irradiation is needed.

NEW CONCEPTS in the management of carcinoma of the breast have been developed during the last two decades. The possibilities of integrating the procedures and modalities of surgical and radiation technics vary with the approach to the problems.

There is growing agreement that, in addition to lesions technically impossible of resection, there are advanced cases in which the radical mastectomy is not only futile but actually harmful, since it may result in a high incidence of carcinomatoses of the chest wall and probably earlier clinical manifestation of distant metastases.

Local dissemination by implants in the surgical area is a well-documented fact. There is also increasing evidence that distant metastases can be produced by clumps of tumor cells thrown into the circulation by the surgical procedure.

The discovery that breast carcinoma spreads directly not only to the axillary nodes, but also to the internal mammary chain of nodes and via these two routes to the nodes of the supraclavicular region and upper mediastinum has changed the concept of the classical radical mastectomy.

Comprehensive local treatment of breast cancer must include not only the resection of the axilla, but also be directed to the lymphatics of the apex of the axilla, supraclavicular region, upper mediastinum, and internal mammary chain. This can be either accomplished by the supraradical mastectomy or the association of the classical radical mastectomy with the irradiation of the remaining lymphatics.

Classification of Lesions

In our institution breast cancers fall into one of the following three groups (Table 1).

(1) The first group is composed of cases which are unquestionably suitable for radical mastectomy because the primary tumor and axillary nodes are small. If the tumor is located in one of the outer quadrants of the breast and the axillary nodes are negative on histologic examination of the surgical specimen, no postoperative irradiation is given. If the tumor is located in one of the inner quadrants or is subaerolar and/or the axillary nodes are histologically positive, postoperative irradiation is given to the apex of the axilla, supraclavicular region and internal mammary chain of nodes. If the tumor is found operable by these rigid criteria, recurrences in the chest wall are very rare, and therefore the chest wall is not irradiated routinely. In the patients referred for postoperative radiation following a radical mastectomy performed elsewhere, the chest wall may be irradiated if it is inferred from the description of the disease prior to operation and the histologic findings that the case was of border line suitability for radical mastectomy.

(2) The second group is composed of cases in which the lesion has been disturbed surgically and in which it was only questionably operable. These are cases in which the pri-

*Read before the Section on Radiology, Southern Medical Association, Fifty-Second Annual Meeting, New Orleans, La., November 3-6, 1958.

†From the Departments of Radiology and Surgery, The University of Texas, and the M. D. Anderson Hospital and Tumor Institute, Houston, Tex.

TABLE 1

PATIENTS SEEN WITHOUT PREVIOUS TREATMENT AND WITHOUT EVIDENCE OF DISTANT METASTASES
(1947 to 1956)

			Palpable Nodes	*Histologically Positive*
Group I	Radical mastectomy alone	108	30%	20%
	Radical mastectomy plus postoperative radiation	183	37%	29%
Group II	*Preoperative radiation followed by radical mastectomy	83	58%	38%
Group III	Simple mastectomy and radical radiation	98	75%	
	Radiation alone	109	64%	
Miscellaneous:	Preoperative radiation followed by simple mastectomy	16		
	Simple mastectomy alone			
	Short treatments			
		597		

*Thirty-four patients were treated with the cobalt-60 teletherapy unit.
Approximately 50% of the patients are considered suitable for a radical mastectomy first. This incidence would vary in other institutions with the geographic location and the proportion of indigent versus private patients.
In 60% of the cases of those who had a simple mastectomy followed by radiation, the primary tumor was larger than 8 cm. in diameter. Seven patients of a group of 19, with a minimum 5 year follow-up, are alive with no evidence of disease.

mary tumor is somewhat large (more than 5 cm. in diameter), or there is marked edema of the skin, or the axillary nodes are large or multiple, or there has been an open biopsy a week or more previously. Preoperative radiation is given to be followed 6 weeks later by radical mastectomy.

The purpose of preoperative irradiation is twofold: to sterilize microscopic disease often present in the dermal lymphatics of the skin (tumor cells in microscopic nests are much more radiosensitive), and to devitalize tumor cells in the hope of preventing implants in the surgical area or metastases at a distance (Table 2).

(3) The third group is composed of cases in which the lesion is either technically unresectable or clinically inoperable according to criteria similar to those of Haagensen. In these cases, the primary tumor is quite large

TABLE 2

RADIATION EFFECT*

		None	*Slight*	*Moderate to Marked*	*Nonviable*
Residual tumor in breast only	9	0	1	8	0
Residual tumor in axillary nodes only	9	0	3	4	2
Residual tumor in both — Breast	7	0	3	4	0
Residual tumor in both — Axilla	7	1	0	4	2
Total cases with residual tumor (in 25 breasts and/or 25 axillae)	25	1	7	20	4

*Specimens studied and table prepared by: Wm. O. Russell, M.D., Pathologist-in-Chief and Stephen H. Gallagher, M.D., Assistant Pathologist; The University of Texas M. D. Anderson Hospital and Tumor Institute, Houston.
Fifty consecutive specimens from radical mastectomy (preoperative irradiation with cobalt-60 alone or 25% of dose with 250 kv.) were reviewed in an attempt to evaluate the effect of radiation. The clinical diagnosis of carcinoma was substantiated in 49 by preradiation biopsy. In the remaining case, an inflammatory carcinoma irradiated without prior biopsy, residual tumor was found in the amputated breast. Metastatic carcinoma was present in two axillary node biopsies done before irradiation. It is interesting that tumor was not found in either of these cases after radiation therapy.
Four arbitrary degrees of radiation damage were established for the purpose of this study: (1) *none*—no discernible change in tumor cells; (2) *slight*—intracellular edema and occasional cytoplasmic vacuoles; (3) *moderate to marked*—nuclear swelling or pyknosis, irregularity or clumping of chromatin, extreme granularity and vacuolization of cytoplasm and loss of cell borders. (These changes were most frequently encountered); and (4) *nonviable*—only cell outlines remaining, or fragmentation of the nuclei.
Complete removal of the breast tumor constituted the initial biopsy in some of these patients, but the infrequency of residual carcinoma can scarcely be explained on this basis alone. It should also be noted that in most instances the residual tumor recorded was minimal in aggregate volume, and often consisted of only one or two microscopic foci.
Acellular fibrocalcific nodules were found in four of the cases recorded as showing no remaining tumor. Whether these represented totally destroyed tumor or were the result of the earlier surgical procedure was felt to be indeterminable. Similar nodules in lymph nodes, found in two cases, were reported as nonviable tumor.
In summary, in 100 specimens (50 breasts plus 50 axillary contents) one instance only of unaltered cells was found and seven instances of slight damage. In all other cases (more than 90%) either no tumor was found or markedly damaged cells.

(8 to 10 cm. or more in diameter); or there is cutaneous edema or marked direct attachment to the skin, possibly with ulceration; or there are satellite nodules slightly peripheral to the corpus mammae; or the axillary nodes are large or matted; or there are nodes at the apex of the axilla; or there is slight but definite edema of the arm. With any one or a combination of such findings, the case is no longer considered suited for primary radical mastectomy with or without preoperative radiation. Routine biopsy of the supraclavicular and internal mammary chain nodes is not performed.

In this group of cases radiotherapy is considered the *primary* treatment but is undertaken in one of two ways:

(A) If the tumor is large, possibly ulcerated, and located in a pendulous breast with a pedicle grossly free from tumor, a simple mastectomy is done followed by radical radiation. This "toilette" mastectomy is not to be identified with McWhirter's policy of treatment of breast cancer.

A theoretical but valid objection to the performance of these "toilette" mastectomies is the probability that viable microscopic cancer is cut through. However, this is to be balanced against the very real technical difficulties of irradiating large and at times ulcerated tumors located in pendulous breasts.

The heavy radiation following simple mastectomy is a very radical procedure, actually more exacting for the patient than the radical mastectomy. Therefore, the combination of simple mastectomy followed by heavy irradiation is not substituted as a palliative procedure when a radical mastectomy is not indicated for reasons not strictly concerned with the local disease. For instance, the possibility of distant metastases or disease previously treated in the opposite breast is not an indication. It is only the treatment of choice when a radical mastectomy exposes the patients to a great risk of recurrence in the chest wall and the disease is too advanced to be managed by preoperative radiation followed by radical mastectomy.

(B) If the primary tumor is small but is unsuited for radical mastectomy due to large axillary metastases or supraclavicular nodes or satellite nodules, or if the tumor is of the inflammatory type, or if the tumor fills the whole breast and therefore there is no possibility of cutting through an apparently free pedicle, radiation alone is used.

Limitation of 200-250 kv. and Advantages of Supervoltage Roentgenotherapy

The limiting factors of radical radiation therapy in breast cancer with the 200-250 kv. radiation are skin reaction (perhaps the most striking), pneumonitis, mediastinitis, edema of the arm (usually radiation combined with radical mastectomy) and, more rarely, muscle fibrosis and bone necrosis.

The skin sparing effect of supervoltage radiation (million volt x-ray machines or cobalt-60 teletherapy units) is due to the electronic build-up several millimeters below the surface of the skin. Even with glancing fields, much higher tissue doses can be given with only moderate erythema.

Pneumonitis, mediastinitis, and muscle fibrosis around the axilla and shoulder due to deep tissue dosage are of course not reduced in incidence and severity with supervoltage radiation. These hazards are actually increased due to depth dose and the inherent penumbra of the teletherapy units, resulting in higher tissue doses to the lungs in the glancing fields and junctional areas of the portals.

The skin-sparing effect due to electronic build-up several millimeters below the skin is not entirely favorable because of the characteristic tendency of breast cancer to spread early and extensively into the subepidermal lymphatics. The striking lack of skin reaction may therefore be associated with inadequate radiation of this superficial spread. This was vividly brought out in a patient who had a tumor removed elsewhere. When she was sent to our institution for treatment there were many typical purple papules scattered around the scar. At the end of the third week in a four week course of treatment with the cobalt-60 teletherapy unit, there was only faint erythema of the skin and the purple papules had not changed at all. The last quarter of the treatment was then given with 250 kv. and additional dosage with a 60 kv. unit was superimposed by multiple slightly overlapping portals. The papules eventually disappeared.

This graphic demonstration of the necessity for a greater degree of skin reaction of the

chest wall has led to a combination of 250 kv. and supervoltage roentgenotherapy for the treatment of the chest wall. The proper percentage of each is in the investigative phase. Alternately, bolus could be used with supervoltage for part of the treatment.

The potentialities of supervoltage roentgenotherapy are different depending upon the clinical situations.

Postoperative Radiation Following Radical Mastectomy

The radical mastectomy removes, *en bloc*, the breast tissue with the lymphatics of the axilla, although inadequately at the apex. The internal mammary chain and the upper mediastinal and supraclavicular regions are just as much a part of the proximal lymphatic drainage. Therefore comprehensive treatment must include the lymphatics of the apex of the axilla, supraclavicular region, upper mediastinal and internal mammary chain.

The value of postoperative irradiation has been the subject of a very abundant and conflicting literature. Its value has not been proven.

It is possible to deliver 250 kv. skin doses of 4,000 roentgens to the portal covering the supraclavicular region and the apex of the axilla, and 4,500 r. to a narrow portal covering the internal mammary chain in three weeks with only a tolerable skin reaction (Fig. 1). This gives an approximate tumor dose of 3,500 to 4,000 r. to the nodes, depending upon their depth below the skin. These doses in three weeks are on the low side of effectiveness and should only be cancerocidal for the more sensitive tumors and also possibly for microscopic infestation. Grossly involved nodes are known to be more radioresistant due to the poor vascularization of solid tumor masses. To permanently sterilize recurrences of the chest wall, 5,000 to 6,000 r. in two to three weeks are necessary. Therefore doses of the same order should be given to the peripheral lymphatics.

The skin is no longer the limitation with supervoltage roentgenotherapy. However, with either 2 million volt x-ray generators or existing cobalt-60 teletherapy units, the underlying lung tissue and mediastinal structures are excessively irradiated with ensuing pneumonitis and mediastinitis which can be distressing and even crippling. This has been the experience in institutions where an attempt was made to exceed 4,000 r. in four weeks to the internal mammary chain nodes.

One must, therefore, combine the skin-sparing effect of high energy radiation (cobalt-60 or cesium-137) with a short source-skin distance to produce a fast fall-off of the depth dose and therefore spare the deeper structures. Teletherapy units (cobalt-60 or cesium-137) with a source-skin distance of no more than 15 to 20 cm. should be designed and treatment plans developed to deliver 5,000 or even 6,000 r. in two to three weeks to the peripheral lymphatics to supplement the radical mastectomy.

Preoperative Irradiation; Irradiation including the Chest Wall Following Either a Simple or Radical Mastectomy; Radiation Alone

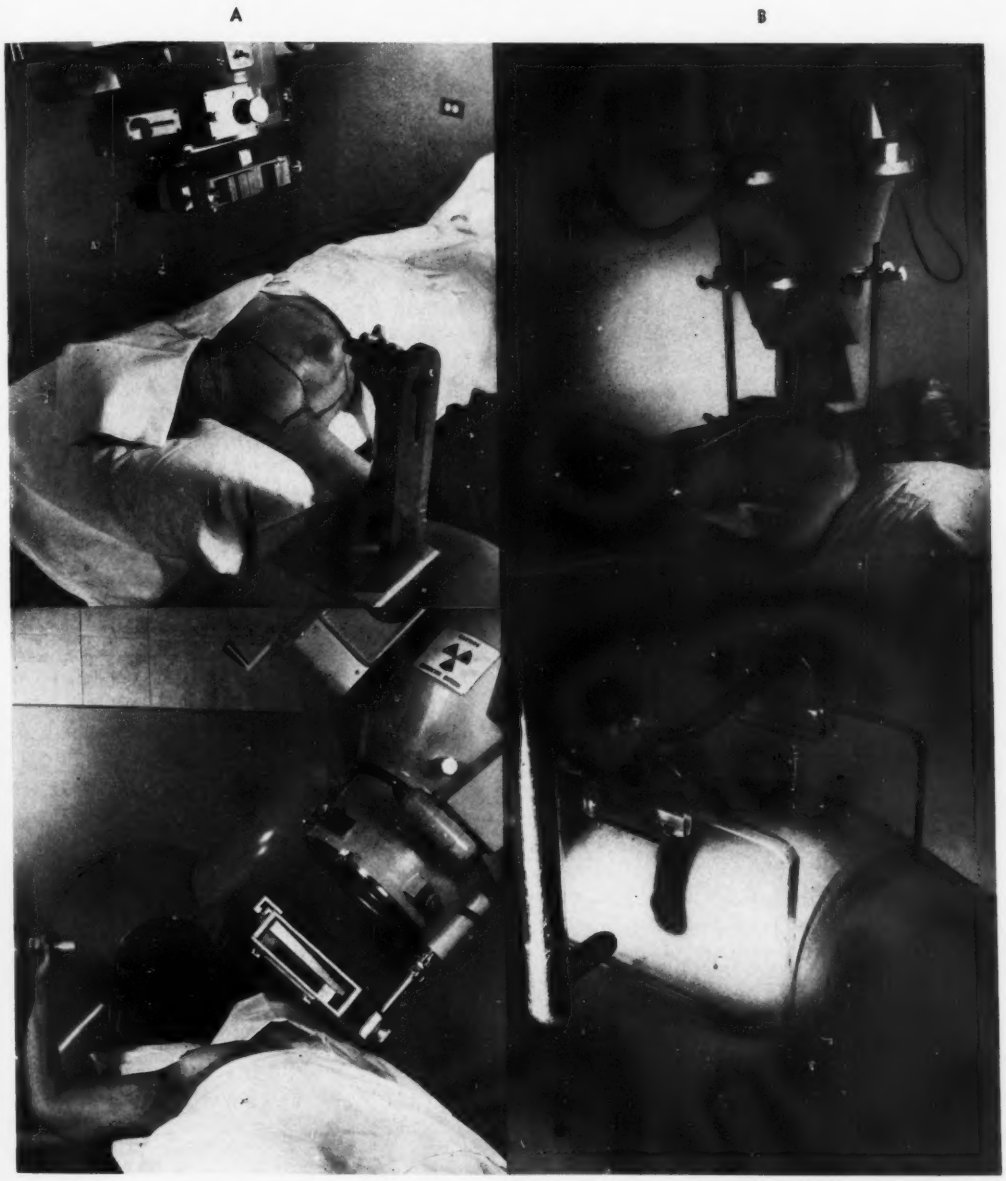
These four clinical situations have in common a nearly identical geometry. The doses vary depending upon the clinical situations.

Figure 2 shows the classical arrangement of an anterior portal which covers the supra-

FIG. 1

Maximum skin reaction for a skin dose of 4,000 r. in 3 weeks to the portal covering the supraclavicular region, apex of axilla and first intercostal space, and 4,500 r. to the strip covering the rest of the internal mammary chain. (4,000 r. to the same node areas cannot be exceeded with existing supervoltage without excessive depth doses.)

FIG. 2



(A) The anterior portal covers in continuity the lower half of the neck, the supraclavicular region (taking care to include its medial aspect), the axilla and the first intercostal space. (B) The posterior axillary portal is irradiated with the arm out to bring the axillary contents away from the chest wall thereby to include a minimum of lung tissue in the beam. The axillary contents, including the apex of the axilla, are treated but there is no contribution to the supraclavicular area. Only part of the shoulder joint is at the periphery of the beam. (C) The margins of the tangential fields are the mid-axillary line laterally, and medially a line 1 cm. on the other side of the midsternum. The medial tangential portal is tilted 10° inward in order to include surely the internal mammary chain nodes. (D) At the end of the planned treatment, supplementary irradiation may be given through smaller portals which cover only residual palpable tumor in the corpus mammae. The tumor mass is squeezed between two plastic plates which are left in place to produce full build-up on the surface of the skin, since the lymphatics of the skin usually are involved above and around the primary mass. This supplementary irradiation of 1,000 to 1,500 r. tumor dose, may produce moist desquamation on a small area.

clavicular region, the axilla and the first intercostal space, of a posterior portal which covers the axilla, and of two tangential portals, medial and lateral. Adaptations of the junction lines between the portals and of their outside borders as well as the dosage and the combination with 250 kv. vary slightly in the four types of clinical situations and also somewhat from case to case.

Adaptations must also be made to the equipment available, million volt or 2 million volt machines, or cobalt-60 teletherapy units of different designs. Due to the convexity of the chest wall, homogeneity of dosage cannot be achieved if bolus is not used throughout.

The posterior portal is drawn to cover only the axillary contents and not contribute to the supraclavicular region, to diminish the dose to the shoulder joint. This has been the practice prior to supervoltage. In the group of cases of preoperative irradiation, or of heavy irradiation following simple mastectomy, or radiation alone, a significant number of patients are alive at five years, and no "frozen" shoulders or necrosis of the bones about the shoulder joint or the clavicle have occurred.

Preoperative irradiation. In the preoperative radiation technic with 250 kv., the axilla receives 4,000 roentgens and the supraclavicular and internal mammary chain nodes approximately 3,500 to 3,750 r. On the average the dose to the middle of the corpus mammae has been 3,000 r. given through tangential portals. Delayed healing has been present in all cases, but has not been of real significance except in a small percentage of cases. However, the sloughs which developed warranted investigation of the use of supervoltage roentgenotherapy.

In 54 cases having had treatment with cobalt-60 teletherapy alone, or with 25% given with 250 kv., there is no difference in healing in comparison with the cases which have no preoperative irradiation.

In the weeks following therapy only a faint to moderate erythema develops and the radical mastectomy is carried out six weeks after the completion of treatment.

Irradiation following simple mastectomy. In the patients treated by simple mastectomy followed by radiation, the dose to the axilla is 4,500 or sometimes 5,000 r. and the dose to the supraclavicular region and internal mammary chain of nodes is 4,000 r. The dose at the midchest wall is approximately 4,500 to 5,000 r. If the scar of simple mastectomy requires more than 21 cm. separation, the medial tangential portal begins laterally to the field for the internal mammary chain, which is used from the beginning. The first 2,000 r. to all portals are given on 250 kv.

At the completion of this treatment, depending upon individual situations, further radiation may be given to a strip along the mastectomy scar by further external irradiation or a radium implant. A tumor dose of 2,000 to 3,000 gamma roentgens can be given with a radium implant, or 1,000 r. if external radiation is used with narrow tangential portals glancing only the mastectomy scar.

On the average, tissue doses are 1,000 r. higher than with 250 kv. alone. In the 57 patients treated in this way no excessive skin reactions have developed. This is in contrast to a similar number treated with 250 kv. alone where massive moist desquamation has occurred in all cases with, in some instances, very slow healing or even an occasional instance of necrosis of the chest wall.

Complete irradiation following radical mastectomy. In the postoperative radiation following radical mastectomy in more advanced cases with likelihood of recurrence in the chest wall, the dose to the apex of the axilla is kept at 4,000 r. (more than that would be likely to produce excessive edema of the arm); the dose to the chest wall depends upon the thickness of the skin flap but will not exceed 4,000 r. The dose to the supraclavicular region and internal mammary chain is 4,000 r.

Radiation alone. Doses of the same order as those delivered following a simple mastectomy are given in the cases treated by radiation alone. In four weeks, (the first two weeks treatment being by the 250 kv. equipment) tumor doses of approximately 4,500 to 5,000 r. to the corpus mammae and 5,000 r. to the axilla are given. Supplementary irradiation by interstitial implant (2,000 to 3,000 gamma roentgens with radioactive gold grains, radon seeds, or radium needles), or through much narrowed portals (Fig. 2, D) (1,000 to 1,500 r. T. D.) is used depending upon the status of the primary tumor. Likewise 1,000 to 1,500 r.

may be given to residual palpable axillary nodes through a very small portal.

Supervoltage therapy allows an increase by 1,000 to 1,500 r. in the tissue dose to the chest wall and 1,000 r. to the axilla, thereby increasing the possibility of control.

Prior to the availability of a cobalt-60 teletherapy unit, the so-called Baclesse technic (three to four month treatment time) was used in patients treated by radiation alone, and is still used in all the inflammatory carcinomas or the carcinomas which have a significant inflammatory component because in those cases a maximum skin dose is essential.

Discussion

The management of adenocarcinoma of the breast has many unsolved problems. However, three problems are primarily concerned with local therapy, that is the disease in the corpus mammae and the proximal lymphatic drainage. They are:

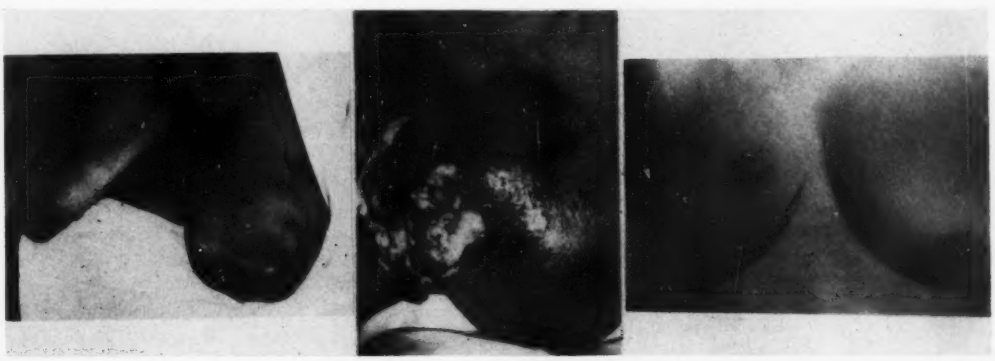
(1) The design of a practical, thorough treatment of the lymphatics of the apex of axilla, supraclavicular region, upper mediastinal and internal mammary chain of nodes. The supra-radical mastectomy is not an easy procedure and, if limited to dissection of the internal chain of nodes, is still incomplete. Short source-skin distance units using either cobalt-60 or cesium-137 can provide an answer.

(2) Primary radical mastectomy in lesions of border-line surgical suitability is followed by too many recurrences in the chest wall. In addition there is circumstantial evidence that patients' lives are shortened. In the past the use of preoperative radiation had been limited by difficulty in wound healing. Supervoltage roentgenotherapy (either million volt x-ray generators or long distance teletherapy units) makes possible preoperative irradiation with no difficulty in healing. It can therefore be used freely, permitting operation upon tumor cells at least partially devitalized (Table 2),[1-3] and therefore diminishing the incidence of local infestations of the surgical area. If such tumor cells are thrown into the circulation by the surgical manipulation they are less likely to develop into distant metastases.

(3) Tumors, either technically or clinically inoperable, according to criteria similar to those of Haagensen, are best managed by radiation alone (Fig. 3). With conventional 200-250 kv. equipment, the best available technic is the Baclesse type of treatment. It has the disadvantage of requiring three and one-half to four months and therefore is economically burdensome. Supervoltage combined with 250 kv. (alternately part of the treatment given with bolus) allows equivalent treatment in four to five weeks, with tumor doses likely to be even more effective.

Supervoltage therapy makes possible the delivery of higher and more effective tumor doses. Lumb's[2] study of operative specimens following preoperative irradiation with doses ranging from 2,000 r. in 20 to 25 days to 3,500

FIG. 3



A B C

(A and B) These 2 patients were managed by simple mastectomy followed by heavy irradiation to the chest wall and peripheral lymphatics. The patients are alive, with no evidence of disease, 9 years (A) and 6 years (B). (C) The lesion is an inflammatory carcinoma treated by radiation alone. The patient is alive and symptom-free at 5 years.

to 4,000 r. in 35 to 40 days shows that, in the group with 3,500 to 4,000 r. only, no viable or markedly damaged cells were found. The doses of 5,000 to 6,000 r. in two to three weeks which can be delivered with short source-skin distance units should be cancerocidal for most metastatic nodes. Delivery of 4,500 to 5,000 r. in four and one-half to five weeks in the post-simple mastectomy or radiation alone cases should also be cancerocidal for the majority of the carcinomas.

It will take many years to determine, based on uncontroversial data, the areas of maximal usefulness of supervoltage roentgenotherapy as well as the best technics and optimal doses. However, with the information already at hand, one can safely say that it will be a most important tool in the part which radiation therapy plays in the management of breast carcinomas.

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A Practical Medical Care Program—Hospital Service for the Indigent*

W. K. SHARP, JR., M.D.,† *Nashville, Tenn.*

The physicians of Tennessee developed a method of providing adequate care for the indigent in a unique fashion which proved to be successful and has much to recommend it over the use of federal funds for recipients of Public Welfare.

DURING the 1876-77 session of the Tennessee Legislature, a physician member of the Senate from Memphis, at the request of a committee appointed by the Tennessee State Medical Association, introduced a bill in the Legislature to establish a State Board of Health. This bill required the Governor to appoint, twenty days after the passage of the act, five physicians of skill and experience, regular graduates of medicine who had been engaged in practice not less than ten years to serve on the Board.[1]

Therefore, the first State Board of Health was organized in Tennessee during the period when the Mississippi Valley was experiencing a severe epidemic of yellow fever. This new Board was concerned almost exclusively with epidemic problems, and was advisory in nature until 1923 when the Legislature reorganized the entire state government. The State Board of Health was abolished and the Tennessee Department of Public Health created with the appointment of a State Health Commissioner who was schooled and experienced in public health work and sanitary science. The law further provided an unpaid advisory board to be known as the Public Health Council to serve in connection with the Department of Public Health.[2]

In 1906, the Southern Medical Association was organized in Chattanooga, Tennessee. The birth and early history of the Association clearly indicates the physicians' desire for more intimate study of some of the problems of the South, of closer fellowship, and of leadership for the welfare of humanity.[3]

The first issue of the Association's journal in 1908[4] points out some of the public health problems such as malaria, pellagra, tuberculosis, and others, and editorially suggests more interest in community sanitation, community water supplies, and education of the public pertaining to public health and urged that each Medical Society become active in this regard.

The progress which public health has achieved in the South through active, dynamic leadership on the part of the physicians of the Southern Medical Association, as they visualized it in Chattanooga in 1906, has been an inspiration to the public generally and of tremendous economic value. This interest and leadership stimulated beyond any doubt whatsoever the development of excellent state and local public health services as an integral part of organized medicine. Nothing like it has been known in the entire brilliant history of medicine in this country. To those excellent leaders in medicine we pay our great respects. They have literally performed miracles in our great Southland and led the South from its strangled disease-ridden area to a greatly improved situation.

When the doctors of medicine in Tennessee decided to do something constructive in furthering the cause for the care of the indigent sick, they, not unlike most medical associations, looked about and found that the House of Delegates of the American Medical Association in 1938 declared that the complete medical care of the indigent is the responsibility of the community and the medical and allied professions, and that such care should be organized by units of local government and be supported by tax funds.[5]

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†From the Tennessee Department of Public Health, Nashville, Tenn.

In 1951, an agreement was reached in conference between the Governor of the State and the Board of Trustees of the Tennessee State Medical Association concerning the following:

1. That there is an acute need for the State of Tennessee to assume some responsibility for the cost of hospitalization, medical care, and treatment of the indigent.

2. The doctors of medicine have agreed with the Governor that they should, without cost to the State of Tennessee, provide professional medical service to such patients.

3. A study should be made of plans to provide for hospitalization, medical care, and treatment for indigent sick persons of Tennessee who are financially unable to pay the cost of hospital care and treatment.

In 1951, the Legislature of Tennessee authorized a Study Commission on Indigent Hospitalization together with an appropriation of $10,000.00 to defray necessary expenses for this study. The Tennessee Study Commission was basically concerned with the following:

(a) The cost of providing adequate hospital services.

(b) The best system of payment for such services.

Provision of care for citizens unable to pay for medical care is one of the most common and yet one of the most pressing hospital problems today. There is no such thing as free hospital care. Somebody must pay for the maintenance of the many expensive services provided by hospitals. Hospitals have three possible sources of income: donations, sick-patients and tax funds. The present situation in this country today is that the paying patient is having to shoulder most of the burden of keeping hospitals open. He is being forced to pay, not only for his own care, but the cost of those who cannot pay, as well as for uncollected accounts, vacant beds, maintenance, educational activities of the hospital and the like.

In 1952, the Study Commission appointed by the Governor made its report.[6] This report has been published and given wide distribution. The following is a list of a few of the most important items:

1. The State of Tennessee should assume part of the responsibility of seeing that hospitalization and medical care are equally available to all indigent sick and injured Tennesseans who can clearly be helped by such treatment.

2. To discharge this responsibility the General Assembly should establish a program for Indigent Hospitalization to be financed by State funds on a basis of matching by the counties.

3. The program should be based upon the principle that the medical profession will provide the professional medical services these indigent patients need while in the hospital *without cost* to the program.

4. The program for Indigent Hospitalization should be designed and administered to pay the cost of hospitalization for those citizens who are sick or injured and who can be markedly helped by definitive treatment in a hospital, and who are clearly unable to meet the full cost from their own resources or those upon whom they are legally dependent. It should not be burdened by attempting to provide purely domiciliary or nursing care for citizens with chronic, permanently disabling illness, or illness already cared for by special programs of the State, such as tuberculosis, insanity, crippled children, et cetera.

5. The determination of medical need should be based on the examination and written certification by a physician who holds a license to practice medicine in Tennessee. The determination of the likelihood of material benefit from hospitalization should be made jointly by the examining physician and staff of the hospital to which the patient is referred. The determination of financial eligibility should be made by or under the direction of a committee in the county in which the patient resides. This committee should be made up of representatives of the county government, the general public and the medical profession.

6. The program should be administered in such a way as to provide hospitalization in whatever participating hospital that can most effectively render the definitive treatment the individual patient needs without regard to the county in which the hospital is located.

7. The program should also be administered in such a way as to supplement, rather than replace, the funds appropriated by cities and counties for this purpose as local funds should be considered as local appropriations to be matched by State funds on a basis determined by the formula.

In April, 1953, the General Assembly of Tennessee enacted legislation (Public Chapter 125, House Bill No. 905), and made an appropriation from the General Fund of the State of Tennessee in the amount of $75,000.00 for the ensuing biennium to be expended after July 1, 1954, and before June 30, 1955, for a modest beginning in developing a Hospital Service for the Indigent in Tennessee. This program was activated July 1, 1954, as follows:

1. The Commissioner of Public Health of the State of Tennessee notified every County Judge or Chairman of the County Quarterly Court of a specific allotment available to the County under the established formula.

2. Rules and regulations were approved by the

Public Health Council, and transmitted to all local Health Officers, all hospitals with ten or more beds, all County Judges, and were published in the September, 1954, issue of the *Journal of the Tennessee State Medical Association.*

3. Any county in Tennessee desiring to participate in this program must:

A. Appropriate or specifically authorize funds in accordance with the allotment of State funds for that county.

B. Have the Quarterly County Court nominate for appointment by the State Commissioner of Public Health a Screening Committee consisting of the following: One member from the medical profession, one member from the County Court, and one member from the public at large. The decision of the Screening Committee shall be final in all cases.

As this program is administered through existing framework, both state and local, there is no confusion, no duplication of effort or misunderstanding. The agreement with county authorities, physicians, and hospitals is clear. The approach to the problem under this plan is administratively sound, economically within our reach and scientifically wise.

Seventy of the 95 counties on their own accord voted to participate the first year of the program and at present all counties, except 3 small counties, have adopted the plan.

Any licensed hospital with ten or more beds and which has on its staff one or more physicians holding an unlimited license to practice medicine in Tennessee is eligible to receive patients. Each hospital must submit data for the determination of reimbursable cost per patient day or accept a set rate. The physician treating the patient who is hospitalized under this program may not charge for his services.

As of this date the hospital statement of reimbursable cost for 108 hospitals averages $16.11 with a high of $25.00 (maximum permitted) and a low of $7.46.

Cancer patients (as a special problem) are not eligible for reimbursement for hospitalization under this program until the patient has been referred to one of the ten cooperative tumor clinics for a specific diagnosis. These cooperative tumor clinics are strategically located in the state and are available without cost to patients in the indigent category.

Effective July 1, 1957, through an amendment of the Federal Social Security Act, funds specifically earmarked for beneficiaries of the Department of Public Welfare were appropriated by The Congress. The language of the act is such that these funds must be administered at the state level of government by the State Department of Public Welfare and not by the Department of Public Health.

In Tennessee and in other states where progress has been made in providing indigent medical care by those trained in medicine, we are suddenly placed in the position of either recommending radical changes in our basic legislation or assuming responsibility for denying to the recipients of Public Welfare benefits of this service. There could be no choice.

In January, 1957, the Legislative Committee of the Tennessee State Medical Association reluctantly approved (?) amendments to our basic Medical Care act. The Tennessee General Assembly enacted legislation which has in effect established two indigent hospitalization services in our state, one administered at the local level of county government in cooperation with the State Department of Public Health for those recipients not of the Department of Public Welfare, and another to be administered at the state level of government for recipients of the Department of Public Welfare by the Department of Public Welfare.

The result is that we are now forced to pay for duplicate overhead costs of administration in addition to coping with the inevitable confusion that is bound to occur.

Because of this confusion, duplication of effort and misunderstanding that is developing, the Tennessee State Medical Association officially adopted a resolution appealing both to the A.M.A. and the Association of State and Territorial Health Officers[7] requesting their assistance to correct this situation.

At the 1958 session of the House of Delegates of the Tennessee State Medical Association, a resolution was approved which was initiated by the Public Service Committee aimed at correcting the inequities brought about by the application of the Welfare Hospital Assistance program.[8]

The resolution was approved unanimously in the House. It cites the history of the original program for hospitalizing indigents leads up to the motion of the Board of

Trustees in January, 1957, which approved the use of federal money to supplement the Hospital Service for the Indigent Program, describes the manner in which the two hospitalization programs developed in contradiction to the wishes of the Board and the Medical Association, and enumerates the evils which resulted subsequent to the inauguration of the Welfare Hospital Assistance Program.

These evils include the waste of money; the upsurge in hospital admissions resulting from authorization for hospitalization granted those persons who are recipients of Welfare aid in Tennessee; and the multiplicity of troubles which sprang from the Pandora's box when a large number of Tennesseans were "blanketed in" for free hospital and medical service, without respect to actual need, under a program administered at the state level and with no local control.

The resolution calls for an end to vendor payments to hospitals by the Welfare Department. An alternative would be the channelling of the money available from Welfare direct to Welfare recipients on the assumption that this money would be budgeted for hospital care as the Federal Congress envisioned when Public Law 880 was passed in 1956. The resolution would also bring about a legislative amendment which would prohibit any hospital or medical service program in Tennessee not administered by the Tennessee Department of Public Health.

The net effect of this resolution, if translated into action, would be to restore control of Hospitalization of the Indigent to the local Screening Committee. Thus, the determination as to medical indigency would be made at the local level by the three member Screening Committee for all applicants for free hospital service in conformance with the letter and spirit of the original indigent hospital program.[8]

Summary

1. It is significant that the first State Board of Health of Tennessee was organized at the request of the Tennessee State Medical Association, and again, in 1953, the Medical Association was directly responsible for the organization of a state-wide Indigent Medical Care Program, totally financed by state and local funds.

2. Medical treatment under the Tennessee plan for the indigent is no different in principle than that now available for everyone else.[9]

3. The program began operation on July 1, 1954, with a state appropriation of $75,000. The next Legislature increased this amount to $150,000 per annum and for the fiscal years ending 1957-59 this was increased to $200,000 per annum, but limited to, and specifically earmarked for non-Welfare beneficiaries. Prior to July, 1957, no line was drawn between Welfare and non-Welfare beneficiaries.

4. In closing I would like to pay tribute to those pioneer physicians who made it possible for us to enjoy the benefits of the organization of the first State Board of Health in Tennessee nearly 80 years ago.

I would also like to pay tribute to the physician who was awarded an International Health Board Fellowship, the first received in the State, for the scholastic year 1922-23 in postgraduate study at the School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md. On the completion of this course of study, he was awarded the certificate in Public Health and he then returned to his native state to become the first trained Commissioner of Public Health for Tennessee.

I would further like to pay tribute to those physicians who conceived and organized the present plan for medical care in Tennessee for a state-wide Medical Care Program.

As Dr. W. S. Leathers, then Dean of Vanderbilt University School of Medicine, pointed out 25 years ago, the rapidly changing social and economic conditions may cause restlessness and perhaps a degree of confusion in our thinking, but the great underlying principle upon which medical practice is founded will be steadfastly maintained.

Ours is a noble heritage, made so by no contribution of our own, but by generations of physicians who have unselfishly sought to do the best they could for suffering mankind. This tradition is ours to preserve and transmit to succeeding generations.

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Discussion (Abstract)

Dr. R. H. Kampmeier, Nashville, Tenn. I wish to thank Dr. Sharp for so ably presenting the story of which the Tennessee State Medical Association is particularly proud,—a story unusual in these recent years of not infrequent conflict between the interests of the public and the medical profession.

As Dr. Sharp has said, a hospital bill in these days must be paid by someone or a third party. (One need not dwell on the increased needs of hospitalization because of the advances of medical science.) Therefore, the medical profession was instrumental in obtaining the legislation which set up the plan for the hospitalization of the indigent, the necessary monies coming from the State's tax funds as well as a share from local taxes. This was in the philosophy so often expressed that care of the needy is best provided in the home community. And the noteworthy feature in the legislation is that the attending physician neither charges nor accepts fees for the case of the patient while hospitalized under this Act.

What should be emphasized is that the determination of both the medical and financial needs, under the provisions of this Act, lie in the hands of those in the community who know, or know of the patient. This contributes to just decisions, avoiding dishonesty and wastefulness. (The average period of hospitalization during the first couple of years was 10-11 days.) Limited funds lead to a conscientious effort to their wise expenditure.

Then, in 1957, were made available federal funds, to be matched by the State for the hospitalization of recipients of aid available under Public Welfare, the monies to be spent by the Department of Public Welfare.

These two methods of hospitalization for indigents running parallel provide interesting contrasts. On the one hand, careful selection of patients for hospitalization by a local committee with the result of an efficient use of funds. On the other hand, a more liberal use of hospitalization with federal funds but with *no* local control. The rise of hospitalization indicates the waste that follows when control leaves a local agency.

It is most unfortunate that the tax dollars when once taken out of the State and then re-allocated to the State can no longer be disbursed under the jurisdiction of the State, but must be spent by a Federal agency.

The medical profession in Tennessee is unhappy about this and wishes that these federal funds could be administered by our Department of Public Health and, as Dr. Sharp has said, the medical profession of Tennessee has spoken out strongly upon this point.

This paper most pointedly contrasts the provision of adequate medical care for the indigent when under the jurisdiction of the local community with that provided by federal funds. I again wish to thank Dr. Sharp for doing this.

Dr. Harmon L. Monroe, Erwin, Tenn. Tennessee's present hospital care of the indigent program dates to about 1937, at which time it was started of necessity in one of our smaller rural counties. The doctors were faced with the problem of people being in accidents, having acute surgical or medical emergencies, and being unable to pay a hospital or doctor. These people were employed and in most instances were earning enough to furnish the necessities of life, but a serious illness or accident was a financial catastrophe. The actual beginning of the plan was an arrangement between the doctors of Unicoi County, the County Court, and the local hospital, whereby these people could be admitted to the hospital and be cared for free of charge insofar as a medical fee was concerned. But the County agreed to pay a *per diem* which was approximately the average cost per patient day at that time.

As Dr. Sharp has pointed out, the Public Service Committee of the Tennessee State Medical Association took this idea as one of its major projects from the beginning. The chairman of the Public Service Committee devoted many days, weeks, even months to the formulation of the plan. Governor Gordon Browning was sold on the idea and appointed a study commission to go into the problem of medical indigency and to offer some plan in the form of proposed legislation. This was presented to the State Legislature and passed. The only thing that has hampered our plan from the beginning has been skimpy funds. The Legislature made a token appropriation during the first biennium and enlarged upon this sum later, but as yet we have not had enough money to make it fully effective. Now the Tennessee Plan of Hospital Care of Indigent is based upon the premise that there is a difference between medical indigency and indigency or welfare recipients as we are prone to think of them. There are many people in all our states who are on the welfare rolls receiving federal aid through one agency or another. But our plan was devised for the person whom I mentioned a moment ago, who is perhaps working, who is certainly in the low income bracket, but nevertheless he is earning enough to provide the necessities of life for himself and his family. Our plan makes it possible for this individual to be treated in a hospital and financial aid given without embarrassment or without his feeling that he is receiving charity. The plan specifically excludes certain diseases or conditions because it was devised for the person who had an acute medical or surgical emergency, and who could be made productive again and returned to his former occupation.

As Dr. Sharp pointed out earlier, the crux of such a plan insofar as administration is concerned is the Local Screening Committee. I cannot emphasize this phase too much. If you will permit me to draw a parallel or rather a contrast between the two plans now operating, I think you will agree that the Local Screening Committee idea is the most important single

phase of the whole picture. Under the hospital care of welfare recipients the person receiving assistance was mailed a card simply stating that he was entitled to thirty days free care in the hospital each year. Now we are told, of course, that it is up to the doctor to say when a person needs to enter a hospital. But upon receipt of these cards with the welfare check, the doctors in Tennessee, especially in the rural areas, were flooded with requests for admission to the hospital either by the recipient himself or by his family who wanted a little rest from caring for this debilitated or disabled person. Under the Tennessee Plan the doctor initiates the action. If you, as a physician, are called to see the man whom I described earlier, and find that he has acute appendicitis, or that he has fallen and broken his leg, or he has lobar pneumonia it is as simple as picking up the telephone, calling the hospital and saying you are sending this man in and then contact the Local Screening Committee. Now who are the members of this Local Screening Committee? First, one member must be a doctor. Secondly, one member must be a member of the County Court, the governmental body directly responsible for the money spent under this plan, the third member must be a taxpaying citizen of that county but cannot be a member of the County Court. So you see we have a distribution of people on our Screening Committee which covers the population of a given county. Now when this person is sent to the hospital under this plan, the doctor automatically foregoes any further charge for his services. It is written into our law that no doctor may charge for services rendered to any person hospitalized under this plan. When this plan was presented to the doctors of Tennessee it met with immediate acceptance. We presented it to the County Judges Association, and they, too, liked it. Our State Legislature thought well of the plan and passed it as it was presented to them, and up to this time we have not found any insurmountable objections. As a matter of fact, it has worked smoothly, it has worked well, it has accomplished its purpose but for one thing and that is simply lack of sufficient funds to make the plan fully effective in the State of Tennessee.

I would like to take this opportunity to thank Dr. Sharp for his presentation of this program, and I want to congratulate him upon the manner in which he has administered the plan in Tennessee up to this time.

The Incidence of Certain Endemic Enteric Virus Infections in Southern Louisiana*

HENRY M. GELFAND, M.D.,† *New Orleans, La.*

Much of the extension of knowledge and understanding of the polio and other enteric viruses in the past decade has been made possible through studies of this type.

THE ENTEROVIRUSES were formally recognized as a discrete group of human parasites as recently as 1957.[1] They constitute a family of enteric viral agents related by similarities in morphology, antigenic and immunologic properties, *in vivo* and *in vitro* tissue tropisms, and epidemiologic patterns. Within the enterovirus group are included the polioviruses, Coxsackie viruses, and ECHO (enteric cytopathogenic human orphan) viruses as subgroups with definable but overlapping properties, and with a gradient of potential pathogenicity for man. Polioviruses, the oldest and best known group, have been recognized as "viruses" since 1906 and as being of three distinct antigenic types since 1951.[2] They may produce pathognomonic lesions in the motor cells of the central nervous system resulting in the paralysis of poliomyelitis, or nonspecific meningeal irritation resulting in so-called "aseptic meningitis," or undifferentiated febrile "grippe," but more often than not, infection results in no clinically evident illness.

Coxsackie viruses were discovered in 1948,[3] when the fecal extracts of two children with paralysis were inoculated into suckling mice and produced unusual, destructive lesions of striated muscles in those animals. The considerable amount of study which followed demonstrated that there were a large number of related agents which could be recovered from human feces, divisible into two groups by the character of the lesions produced in infant mice as well as by certain immunologic relationships, tissue culture sensitivities, and the production of clinical syndromes in man. There are now 19 recognized antigenic types within Group A and 5 within Group B,[1] and several others are currently under study. The Coxsackie viruses have been incriminated as the etiologic agents of a number of human disease entities: herpangina (Group A), pleurodynia and neonatal myocarditis (Group B), aseptic meningitis and undifferentiated febrile "grippe" (Groups A and B),[4] but again, as for the polioviruses, infection is usually asymptomatic.

ECHO viruses had been recovered accidentally from time to time since *in vitro* tissue cultures were introduced in 1951 for the isolation of polioviruses, and a confusing flood of strains followed the use of cultures of monkey kidney cells. They were systematically classified only in 1955[5] and 19 distinct types are now recognized,[1] with many more being investigated. These agents may cause a variety of illnesses in human beings: aseptic meningitis with or without a rash, infantile diarrhea, upper respiratory infection, and undifferentiated febrile "grippe,"[6] but the majority of infections are benign and unrecognized.

Methods of Study

It is apparent that an important characteristic of the enteroviruses is their limited pathogenicity, as measured by the percentage of the infected persons who become clinically ill, despite the existence of occasional strains of relatively high virulence, as measured by the

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severity of the disease when it does occur. Two technics have been found most useful in the epidemiologic study of microbial agents with low pathogenicity: the cross-sectional examination of a population to detect serologic evidence of past infection, and longitudinal observation of healthy people for a period of time long enough to detect the pattern of subclinical infections.

In the Epidemiology Division of the Tulane University School of Medicine, studies of both types have been continuing since 1953. The details of our methods and results (originally oriented solely toward the polioviruses, but more recently expanded to include the other enteroviruses which can be found using monkey kidney cell cultures) may be found in previous publications.[7-10] Briefly restated, they were as follow. Approximately 150 "index" children were recruited at birth, in 1953, from several localities in urban and rural southern Louisiana, born into separate families representative with respect to race, socio-economic status, and family size. Fecal specimens and blood samples were collected from all index children once monthly through 1955, and fecal specimens only, but from all children in the families below 15 years of age, twice monthly thereafter. Blood specimens only were collected annually from all members of the families and from many closely associated individuals. Immediately upon the detection of poliovirus infection in a child, additional samples of feces and blood were collected from the entire family. The fecal specimens were prepared and tested for the presence of enteroviruses in tube cultures of monkey kidney cells using a technic entirely suitable for poliovirus isolation, but too abbreviated to ensure the detection of some of the other slower-growing types. Identification of isolates was accomplished with the use of the appropriate hyperimmune sera. For serologic study, serum specimens were tested for their ability to neutralize prototype poliovirus strains. In addition to the routine collection of specimens, mothers made monthly reports of illnesses in the families.

By these means, a number of significant observations were made on the epidemiologic pattern of the polioviruses in this area. Infection with all 3 types occurs early in life, and the percentage of persons possessing neutralizing antibody (which may be equated with immunity) increases rapidly to a level of about 75% by school age and to over 90% by adulthood. "Infection epidemics" occur at a subclinical level, apparently controlled by the prevalence of type-specific nonimmunes in the population. However, infection occurs earliest among the lower socio-economic groups and in families with the greatest number of children. Primary infection results in fecal excretion which extends over a period averaging between one and two months; reinfection occurs frequently but may not be manifested by a rise in antibody titer, and results in viral excretion lasting only a few days. The virus is probably usually introduced into the family by a nonimmune pre-school child, but then, as a rule, spreads to all previously nonimmune persons within the home. Infection is accompanied by minor intestinal and generalized symptoms in only about 25% of individuals, and among the nearly 400 primary infections detected, none resulted in central nervous system disease of any medical consequence.

Compared to our information about the

TABLE 1

PERCENTAGE OF INDIVIDUALS OF GIVEN AGE WHO POSSESS ANTIBODY IN SERUM DILUTION OF 1:10 FOR INDICATED VIRUS TYPE

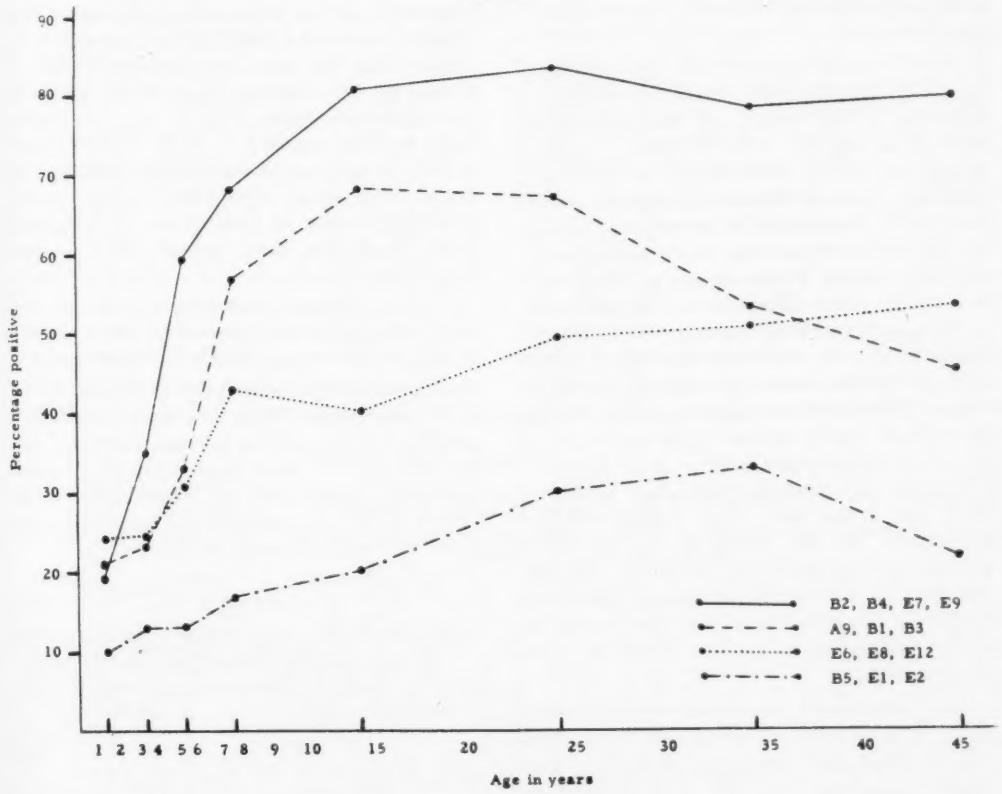
Age	*No.*	*Virus Type*														
		Polio	*Coxsackie*						*ECHO*							
		1	*A9*	*B1*	*B2*	*B3*	*B4*	*B5*	*E1*	*E2*	*E4*	*E6*	*E7*	*E8*	*E9*	*E12*
1-2	84	21	41	0	25	23	36	12	5	14	0	23	5	32	11	17
3-4	56	50	43	2	26	30	48	9	9	20	0	18	23	30	43	25
5-6	50	44	62	2	44	36	70	8	6	26	0	36	26	30	56	26
7-9	50	78	82	36	72	52	68	18	18	16	0	46	66	50	66	32
10-19	43	72	88	54	67	63	65	30	12	19	0	35	63	40	81	47
20-29	67	85	81	42	90	78	94	25	36	28	0	57	75	49	75	40
30-39	87	90	65	40	86	52	85	29	24	46	0	52	75	54	64	46
40 +	35	89	54	23	83	57	83	26	20	20	0	57	74	54	74	49
Total	472	64	57	24	61	47	68	19	17	25	0	40	49	42	55	34

epidemiology of the polioviruses, knowledge of the other enteroviruses is fragmentary. What is known, however, appears, with one exception, to place them into a very similar mold. To help our understanding further, a section of the poliomyelitis study group was examined in the following manner. The 115 index children who were continuously under observation for the 3 year period, January 1954, through December 1956, were chosen for the present study, and the isolation of viruses from their routinely collected fecal specimens was tabulated. Isolated agents were identified insofar as possible with the use of hyperimmune sera for Coxsackie A9 and B1-5 and ECHO types 1-14, and the complement fixation test was used for the group-identification of adenoviruses. For serologic study, 472 sera from family members, collected during the period December 1955-February 1956, were available in adequate volume. These were examined in a final dilution of 1:10, by the neutralization test as mentioned above.

Results

Serologic survey. The age-specific percentages of sera with antibody to 14 Coxsackie and ECHO virus types, and to poliovirus type 1, are presented in table 1. Serologic evidence was obtained for the prevalence in this area of all the virus types except ECHO 4. Because of its weakly antigenic character, failure to demonstrate antibody to E4 in final serum dilutions of 1:10 is not proof of its nonoccurrence. The rarity of antibodies to Coxsackie B1 in young children, despite its prevalence at older

FIG. 1



Individuals possessing antibody to enteroviruses at a serum dilution of 1:10; mean percentages of indicated virus types, separated into 4 patterns of occurrence

TABLE 2

DISTRIBUTION WITHIN SOME FAMILY UNITS OF ANTIBODY TO ENTEROVIRUS TYPES REPRESENTING DIFFERENT AGE-SPECIFIC CURVE PATTERNS

Status Within Family	*Individuals in Indicated Households with or without Antibody to Given Virus Type*																			
	*ECHO 9**					*Coxsackie A9***					*ECHO 8†*					*ECHO 1‡*				
	1	*30*	*46*	*86*	*129*	*1*	*30*	*46*	*86*	*129*	*1*	*30*	*46*	*86*	*129*	*1*	*30*	*46*	*86*	*129*
Father	+	0	+	0	0	+	+	0	0	+	0	0	+	0	0	0	0	0	0	0
Mother	+	+	+	0	+	0	0	0	0	0	+	+	0	+	0	+	0	0	0	+
Sibling 1	+	+	+	0	+	+	0	0	0	+	0	+	+	+	+	0	0	0	0	0
" 2	+	+	+	0	+	+	0	0	+	+	0	+	+	+	+	0	+	+	0	+
" 3	+	+	0	0	0	+	0	0	+	+	+	+	+	+	+	0	0	0	+	+
" 4	+	0		0		+	0		+		0	0		+		0	0		+	
" 5	+			0		+			+		0			0		0			0	
" 6	+			0		+			+		0			0		0			0	
" 7	+			0		+			+		0			+		0			0	
" 8				0					+					+					0	
" 9				0					+					+					0	

*E9 represents the "polio-like" group of age-specific accumulation curves
**A9 represents the "high level" group of age-specific accumulation curves
†E8 represents the "intermediate level" group of age-specific accumulation curves
‡E1 represents the "low level" group of age-specific accumulation curves

ages, is notable, suggesting that this agent has not occurred in our study area in recent years, and that an epidemic opportunity is developing.

There is great variety in the age pattern of these several antibodies; some are similar to poliovirus 1 and others are markedly different. There appear to be 4 general types of age-pattern curves, with several viruses represented by each. In figure 1, composite curves have been constructed by averaging the age-specific percentages of the virus types composing each pattern. These varying patterns could result from either differences in the infectivity of the agents and their tendency to be disseminated within the home or differences in the duration of detectable antibody following infection. A limited investigation of the decline in antibody titer to several types over a period of 4 years suggests that decline to an undetectable level may occur frequently for certain of them, and is the more likely explanation for differences in the antibody accumulation curves. In addition, other studies[11,12] and limited data of our own show that ECHO 1 and Coxsackie B5, which have low, flat curves, do spread within the household as readily as do the polioviruses.

The patterns of occurrence within households of antibody to the various virus types were studied, and consistent differences emerged. Those for 4 viruses in 5 families are illustrated in table 2. With poliovirus, an agent that is spread readily within the household and which stimulates the production of long-lasting neutralizing antibody, it is usual to find positive all children older than the youngest positive child. From this table it is evident that for ECHO 9 and Coxsackie A9 this is also the rule, but that for ECHO 8, which has an "intermediate level" antibody accumulation curve, "skips" occur occasionally, and for ECHO 1, with a "low level" curve, "skips" are characteristic. Again, it appears more likely that these "skips" result from the decline in titer of pre-existing antibody than that these people have escaped infection.

A small number of sera from children were screened for antibodies to the other ECHO types, and all except E13 were demonstrated.

The serologic results were examined to detect associations with sociologic and geographic factors, and, in general, increased percentages positive were found with lower socioeconomic status and a larger family size. There were no marked differences in prevalence between the localities studied.

TABLE 3

THERE WERE 613 VIRUS STRAINS ISOLATED FROM FECES OF 115 CHILDREN EXAMINED MONTHLY OR SEMIMONTHLY DURING 1954, 1955 and 1956

Poliovirus type	1-73	ECHO type	6-8
"	2-48	"	7-54
"	3-69	"	8-24
		"	10-32
Coxsackie type	A9-17	"	11-25
"	B2-22	"	12-16
"	B3-24	"	14-25
"	B4-20		
"	B5-13	Adenovirus	— 15
		Unidentified	—128

TABLE 4

ISOLATIONS OF MKC CYTOPATHIC AGENTS FROM 115 CHILDREN, FROM 1954 THROUGH 1956, PER 1,000 PERSON-MONTHS OF OBSERVATION

		Isolations Per 1,000 Person-Months																	
Year	*Person-Months*	*Poliovirus*			*Coxsackie*					*ECHO*							*Adeno-virus*	*Un-typed*	*Total*
		1	*2*	*3*	*A9*	*B2*	*B3*	*B4*	*B5*	*6*	*7*	*8*	*10*	*11*	*12*	*14*			
1954	1,272	7	23	27	11	0	2	9	0	1	0	10	7	4	3	6	8	19	135
1955	1,240	23	9	10	0	12	10	5	8	3	8	8	6	3	7	3	1	19	137
1956	1,294	28	6	17	2	5	7	2	2	2	34	1	12	12	2	11	3	62	209
Total	3,806	19	13	18	5	6	6	5	3	2	14	6	8	7	4	7	4	34	161

Virus isolations from index children. During the period of 3 years, 613 virus strains were isolated from these 115 children. Their distribution by type is given in table 3. The 3 polioviruses and E7 were found most frequently whereas some types were not isolated at all. It may be added, however, that ECHO types 1 and 9 have been recovered this year.

The distribution of the 613 strains by year and by month, is presented in tables 4 and 5 as the number of isolations per 1,000 person-months of observation, and the salient data are graphically shown in figures 2, 3, and 4. The 3 year average of the percentages of children excreting viruses of all the isolated types by month, figure 2, demonstrates the consistent seasonal variation, with maximal occurrence in the months of summer and early autumn. Annual variation was not marked, especially when it is remembered that collection of specimens was increased to twice per month in 1956, thereby increasing the likelihood of isolation when infection did occur. In figure 3 are shown the mean monthly percentages of isolation of the 3 groups within the enteroviruses (poliovirus types 1-3, Coxsackie A9 and B2-5, all ECHO types except 10). These curves have been drawn to different scales to facilitate comparison of the seasonal patterns. Figure 4 shows ECHO type 10 and the still unidentified viruses. (Note again that the curves are drawn to different scales.) Although there were relatively few E10 isolations, their distinct concentration during the winter months was the only example of this seasonal distribution in this study. The curve for the unidentified agents is very irregular, emphasizing the heterogeneity we expect to find in this group, the separate peaks of the curve perhaps reflecting discrete waves of infection with different virus types.

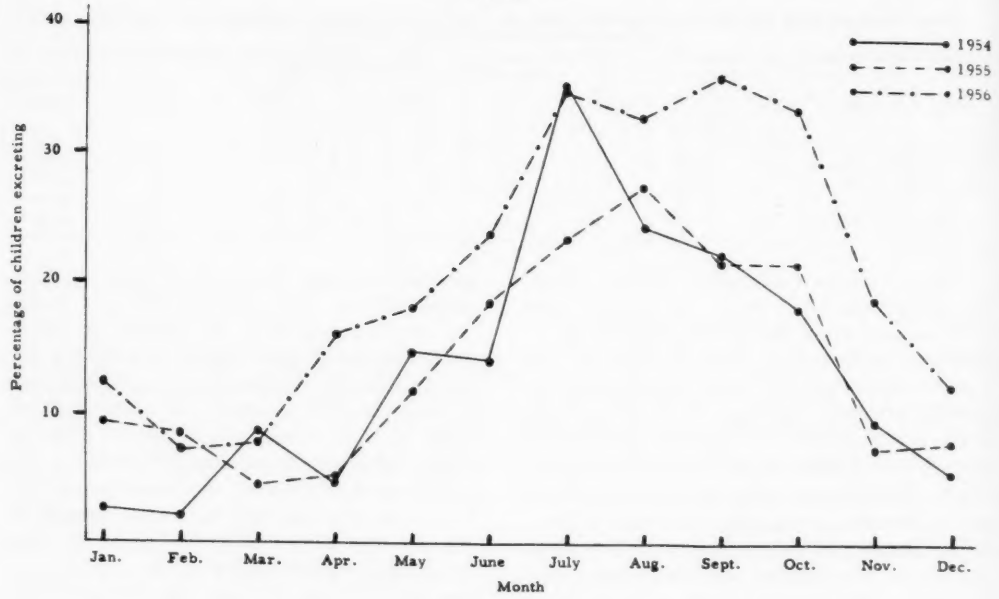
Not readily apparent in these tables is the sharp epidemic of ECHO 7 which occurred during 1956. This agent had not been isolated during 1954, and was first found in a New Orleans child in August, 1955. The subsequent chronology of *new infections* in the 3 study areas is presented in table 6. The individual outbreaks appear to have been temporally discrete and separate. Study of virus

TABLE 5

ISOLATIONS OF MKC CYTOPATHIC AGENTS FROM 115 CHILDREN, FROM 1954 THROUGH 1956, PER 1,000 PERSON-MONTHS OF OBSERVATION

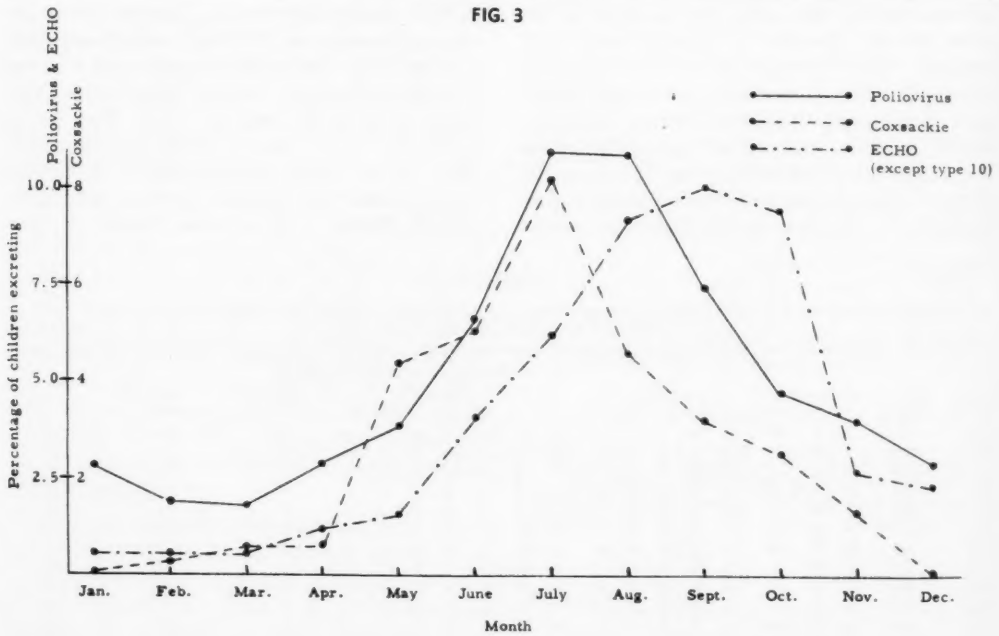
		Isolations Per 1,000 Person-Months																	
Month	*Person-Months*	*Poliovirus*			*Coxsackie*					*ECHO*							*Adeno-virus*	*Un-typed*	*Total*
		1	*2*	*3*	*A9*	*B2*	*B3*	*B4*	*B5*	*6*	*7*	*8*	*10*	*11*	*12*	*14*			
Jan.	331	9	6	12	0	0	0	0	0	0	0	0	24	6	0	0	6	18	82
Feb.	313	3	10	6	0	0	3	0	0	0	0	0	19	0	3	3	0	13	61
Mar.	336	9	6	3	0	0	3	3	0	0	0	6	12	0	0	0	15	12	69
Apr.	323	22	3	3	0	0	0	3	3	0	0	6	6	6	0	0	3	31	87
May	319	25	6	6	16	9	13	6	0	3	3	0	3	6	0	3	9	38	147
June	319	28	19	19	3	9	25	6	3	0	13	13	6	9	0	6	0	28	188
July	322	28	37	44	16	9	13	19	25	0	22	3	6	16	16	6	3	50	311
Aug.	306	42	23	42	20	10	3	10	3	10	46	10	3	6	16	3	0	33	281
Sept.	309	36	13	26	0	16	10	3	3	13	32	10	6	13	13	19	6	49	269
Oct.	320	16	6	25	0	9	3	9	3	0	41	19	3	9	3	22	3	72	214
Nov.	299	10	10	20	0	7	3	3	0	0	10	10	3	0	0	6	0	37	120
Dec.	309	3	13	13	0	0	0	0	0	0	6	0	6	6	0	9	0	26	84
Total	3,806	19	13	18	5	6	6	5	3	2	14	6	8	7	4	7	4	34	161

FIG. 2



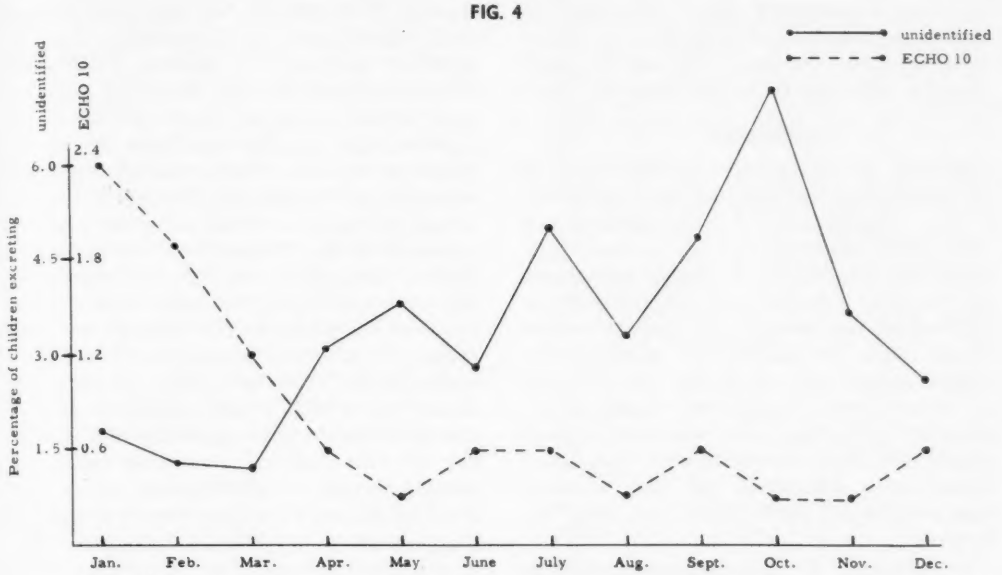
Percentage of children found to be excreting in the feces a virus of any type, by month, 1954-1956

FIG. 3



Percentage of children found to be excreting in the feces a virus of the poliovirus, Coxsackie, and ECHO (except E10) groups, by month, 3-year average

FIG. 4



Percentage of children found to be excreting in the feces

ECHO type 10 or a still unidentified virus, by month, 3-year average

excretion in siblings of the index children indicated that, in general, when one child was infected with E7, all other susceptible children in the home also became infected.

Considering now only discrete episodes of infection among the 115 children here considered, as indicated by the first isolation of a particular viral type, the average was 4 per child during the 3 year period. The greatest number in any child was 11, and only one child had no detected infections. Table 7 illustrates the experience of a few selected children during a single year of observation. Unequivocal evidence of reinfection in a child who had previous homologous infection without antibody formation was detected three times, once with P2 and twice with E7.

An association between socio-economic status and the frequency of new infections of all types was demonstrable, but was not striking. It was, in descending order: Negro, white lower economic, white upper economic. There was little consistent association demonstrable with family size.

Detailed study of the health records of these children to detect associations between viral infection and minor illness has not been done since a home visit for confirmation and verification was made by the nurse only in the event of poliovirus isolation. Negative reports are therefore of little significance. However, we can state definitely that during this time

TABLE 6

ISOLATIONS OF ECHO TYPE 7, WHICH REPRESENTED NEW INFECTIONS, AMONG CHILDREN IN NEW ORLEANS, BATON ROUGE, AND 4 SEMIRURAL PARISHES DURING 1955 AND 1956

Area	No. of Children	Number of First Isolations Made in Indicated Year and Month																		Total
		1955						1956												
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
New Orleans	43	0	1	0	8	0	0	0	0	0	0	0	0	0	6	6	0	2	0	23
Baton Rouge	30	0	0	0	0	0	0	0	0	0	0	1	4	1	1	0	0	0	0	7
Semi-rural parishes	42	0	0	0	0	0	0	0	0	0	0	0	0	4	2	1	2	0	2	11
Total	115	0	1	0	8	0	0	0	0	0	0	1	4	5	9	7	2	2	2	41

no child experienced illness involving the central nervous system sufficiently important to be noted by the parents, or any intestinal disorder sufficient to require hospitalization.

Discussion

It must be emphasized that this report of the enteroviral experience of these children is a mere by-product of a study planned and executed to investigate only the natural transmission of polioviruses. As already mentioned, the virologic technics used were relatively inefficient for the isolation of many enteroviral strains. Also, the addition of another tissue culture system, such as the HeLa cell, as well as infant mouse inoculation, would almost certainly have added other isolations of many strains and types not detectable in monkey kidney cells. Therefore, the data reported must understate significantly this viral experience.

Nevertheless, the demonstrated volume of excretion is most impressive. During the summer and autumn months in this area, over one-third of the healthy children are discharging some virus in the feces at any given time. In lower socio-economic groups, the percentage of fecal excretors is even greater. The effect of season was very distinct for all of the viral types. With one exception, there was a marked increase in transmission during the warmest months of the year, a feature characteristic of agents with a fecal-oral mechanism. The very interesting exception was ECHO 10, for which isolation was maximal during the winter months. This is more characteristic of agents with a respiratory mode of transmission, and a finding in agreement with the suggestion that E10 be classified elsewhere than in the ECHO group because of other distinctive virologic characteristics.

The absence of significant overt disease coincident with these proved infections is especially noteworthy. It demonstrates our dependence on studies of subclinical infections such as the present one. Although for complete understanding we must have the whole epidemiologic picture, significant disease resulting from enteroviral infection represents only that small portion of the iceberg showing above the surface, while the great bulk of transmission lies hidden below the level of clinical recognition. On the other hand, the low pathogenicity of the enteroviruses makes proof of any pathogenicity difficult and also makes possible an erroneous interpretation of pathogenicity. The occurrence of the "epidemic" of ECHO 7, which involved 34% of our index children, re-emphasizes the caution that must be observed when these agents are isolated during an investigation of an outbreak of disease. Had there been a coincidental epidemic of any illness, a large percentage of sick children could have provided a suspicious isolation.

The so-far untyped viral isolates are also of great interest. They may include mixtures or antigenic variants of the presently identified types, herpes simplex, mumps, ECHO types above 14, Coxsackie A types other than A9, or still undescribed ECHO viruses.

Summary

Qualitative serologic examination of 472 individuals living in Southern Louisiana demonstrated the prevalence of neutralizing antibodies against poliovirus 1-3, Coxsackie viruses A9 and B1-5, and ECHO viruses 1-3, 5-12, and 14. Of the types investigated, only ECHO types 4 and 13 were lacking in a final serum dilution of 1:10. The age-specific patterns of occurrence of the prevalent types fell into 4 distinct groups in terms of the relative increase with age of the percentages positive. It

TABLE 7

HISTORY OF VIRUS RECOVERY DURING ONE YEAR OF OBSERVATION IN CERTAIN SELECTED CHILDREN

Index Child No.	Race	Year	Virus Types Isolated During Indicated Month												Total	
			J	F	M	A	M	J	J	A	S	O	N	D	Infected Months	New Infections
32	Negro	1956			U*	E10-P1	PI	B3		A9					5	5
33	White	1956		P1	P1	P1		E11-U		E7	E7	E7			7	4
37	White	1956			P1	P1			E10-E11	E11	E6				5	4
119	White	1956		U		U	U	P3	P3	P1	E14				7	5 (?)
132	White	1956						U	U-P3-E12	E12	P1				4	4
146	Negro	1955				P1	B3		B5-U			U	P2	P2	6	6

*U—Unidentified

was suggested that these differences were more likely the result of variations between the types in the duration of detectable antibody than of variations in the ease of transmission within households.

From 115 newborn children, under continuous observation during the period 1954 through 1956, 613 enterovirus strains were isolated from fecal specimens. These included polioviruses, Coxsackie viruses, ECHO viruses, adenoviruses and some still unidentified. Annual, seasonal, and socio-economic variations in occurrence were described. No significant central nervous system or intestinal disease occurred coincidentally with these infections. Some difficulties in the epidemiologic study of such relatively nonpathogenic agents were discussed.

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Reiter's Syndrome Versus Keratosis Blennorrhagica Sine Blennorrhea*

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The authors have considered the controversy regarding the etiology and the histopathology of the Reiter's syndrome, and have attempted to simplify the terminology.

In 1937, Lord and Zeligman,[1] attempted to prove that keratoderma blennorrhagica was a misnomer. They stated that the cutaneous lesions were not true keratoses, but consisted primarily of parakeratosis and that the condition was probably associated with etiologic agents other than the gonococcus. They analyzed 167 published reports, covering 189 cases of this syndrome. The first clinical description was published in 1818 by Brodie,[2] Launois[3] reported another case in 1899. Reiter's report[4] appeared in 1916. In 146 of the cases, the gonococcus was identified by examination of gram-stained smears, and in 29 cases microscopic examination for the gonococcus was unsuccessful. Recent investigators have been unable to establish the gonococcal origin of these conditions.[5,6] In some instances authors have associated the appearance of cutaneous lesions with the presence of the Shiga, or Flexner bacilli.[6] Recent investigations indicate that Reiter's syndrome may be associated with the presence of pleuro-pneumonia-like organisms.[7]

The following three cases of Reiter's syndrome are reported in an effort to clarify nomenclature. Included is the case originally reported by Lord and Zeligman with more recent observations.

Report of Cases

Case 1. H. M. O., a white man, aged 23, was first seen on Oct. 22, 1936. He had a urethral discharge for 6 weeks and multiple joint pains. He complained of pain in his eyes and mouth of about 2 weeks duration. The family history was noncontributory. In both 1930 and 1931 he was incapacitated for 7 weeks by pleurisy of apparently unknown etiology. In 1932 he sustained knee injuries which were treated by physiotherapy. In the winter of 1934-35 he had coitus with a person who may have had gonorrhea. Several days after this exposure he developed a slight colorless, urethral discharge which cleared spontaneously in approximately 2 weeks. Smears of the discharge examined at the U. S. P. H. S. Hospital were negative. No cultures were made.

In 1935 two abscessed teeth were removed. Early in 1936 he had swelling and pain of the distal phalangeal joints of the hands, more marked on the left; the symptoms subsided in 2 weeks after two abscessed teeth were removed.

The *present illness* began on Sept. 8, 1936, when he noticed redness and irritation at the head of his penis and a slight urethral discharge (his last sexual contact had occurred 8 weeks before). A urologist made the diagnosis of urethritis and prostatitis. The first smears of the discharge were negative for any bacteria, but on Sept. 25, *B. coli* was demonstrated. The discharge gradually became thick and profuse. He visited another urologist who also failed to find the *N. gonorrheae*. He was treated by this physician with urethral irrigations of potassium permanganate. Thirty urethral and prostatic examinations, negative for specific microorganisms, were made before hospitalization.

On Oct. 6, he noted some stiffness of his left knee. The next morning this knee was swollen, hot, red, painful, and stiff; the eyes were congested, and a profusion of lesions "raw spots" had developed on the tongue, lips, and buccal mucosa. Several days later there was a creamy purulent discharge from both eyes. Within a few days the left ankle swelled, and a week later the right wrist and the phalangeal joints of the right hand were affected. Subsequently the right knee and ankle also became swollen and painful.

Physical examination on admission revealed the following positive findings: The skin showed some pallor. The conjunctivae were red and a small amount of secretion was present in both conjunctival sacs. Tenderness was present at the tip of the nose. The turbinates were rather swollen interfering somewhat with respiration. Stomatitis was present; there were neither exudate nor ulceration, but there was hyperemia of the oral mucous membrane. A few carious

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teeth were found. Tenderness was elicited below the angles of the mandible. Enlarged posterior cervical glands were palpated bilaterally.

The right knee joint contained no fluid, could be extended normally and could be flexed to a right angle, but forced flexion and extension were painful. The left knee contained a slight amount of fluid with capsular thickening. Forced extension was painful and flexion was possible to 25 degrees. The right wrist was held in palmar-radial flexion and the fingers in extension. Pronation and supination of the right wrist were limited and painful. The left wrist was negative. There was tenderness over the left hip, the pelvic bones, and the dorsal and lumbar vertebral spines. There was some pain and tenderness around the right shoulder and right elbow.

The testicles and epididymis were normal. There was a purulent discharge from the urethra. The prostate on rectal examination was painful but not enlarged; seminal vesicles could not be palpated.

Course. During the course of his stay in the hospital the joint involvement of the phalanges, the hips, and left elbow continued for several months. There was also some pain in the spine, the left shoulder, and the neck. Casts were applied on Oct. 30 from midthigh, including feet and legs in a semi-flexed position, and the right arm was splinted.

On Nov. 17 the patient developed paronychia of the fingers of both hands, and also involvement of the skin of both palms. On Nov. 27, when the casts were removed there was involvement of the skin of the soles. Paronychia had developed on the large toes. The skin eruption spread over the legs, thighs, and arms. Cultures taken from the involved skin were negative. The buccal lesions promptly disappeared following the use of potassium chlorate. The joint manifestations and skin lesions gradually improved. The eyes responded well to local treatment, although they were subject to intermittent periods of irritation and pain. Anxiety symptoms complicated the picture.

On Dec. 1, the patient presented marked thickening of the soles, the right palm, and the distal phalanges of all the fingers. The nails were raised from their beds by a hyperkeratotic process. Almost the entire soles as well as the right palm and all aspects of the fingers were involved by the development of numerous large hyperkeratotic tuminescences. Many of these lesions were covered with adherent blackish encrustations. There were a half dozen glassy (1 mm. to 1 cm.) hyperkeratotic crusted lesions in the left palm. Extending up the right thigh to the buttocks from the leg, were numerous encrusted papules and an occasional frankly pustular lesion.

The impression was blennorrhagic keratoderma. A biopsy of one of the younger lesions on the right thigh revealed the typical histologic picture of keratosis blennorrhagica.

Readmission. The patient was readmitted to the hospital on Aug. 5, 1941. He stated that he started to work 2 months after he was discharged in 1937, and in several months could take an active part in sports. He had been married one month before his admission to the hospital in 1941. One week before admission he had had a temperature of 103° and thought he was getting the grippe. He was treated with sulfathiazole. At the time of admission to the hospital he had a recurrence of swelling in the joints, stomatitis, conjunctivitis, and urethral discharge. Attempts to find the gonococcus were unsuccessful. Later he developed keratotic skin lesions similar to those which occurred during the first attack.

The patient had a spiking fever, the white blood count was 14,000 and the sedimentation rate was increased. He was given injections of typhoid vaccine intravenously and in about 10 weeks had improved. He was discharged in Dec., 1941, and has not been seen since then.

Case 2. Rev. J. A. W., a white man aged 37, was admitted to St. Joseph's Hospital on Sept. 10, 1950, with a history of infection of the right eye, pain and limitation of motion of the right elbow joint, and similar changes in other joints. The symptoms began in Feb., 1950, with swelling and redness of the involved joints. He had been treated with aspirin, other salicylates, testosterone, colchicine, cobra venom and injections of cortisone. He had had recurrent episodes of arthritis for 5 years prior to this illness.

Examination disclosed a flexion deformity of the right fifth finger with redness and swelling of the interphalangeal joints. The ankle joints were swollen and painful on movement. The metacarpophalangeal joints of the first two fingers were swollen and painful. The shoulder joints were similarly affected and were immobile. A diagnosis of rheumatoid arthritis was made.

The scalp revealed marked scaling and redness. Paronychia were present in six fingers. The fingernails were thickened in their terminal half and discolored. A dull pink scaling dermatitis was present on the scrotum and penis. Maceration was present between the toes; on the right big toe was a hypertrophic lesion with a thickened keratin layer.

Laboratory findings disclosed negative scrapings for fungi from the nails and skin. Hgb. was 75 and 88% on two occasions. White cell counts were 8,650 and 11,550, with normal differential counts. The sedimentation rate was found to be 41 to 47 mm. All other studies were negative. A biopsy was attempted from one of the periungual lesions without much success because the parakeratotic crust separated from the surface.

Roentgen ray examination showed atrophy of the bones of the shoulder girdle and roughening of the joint surfaces of the affected joints. The roentgenologist interpreted the picture as suggestive of acute rheumatoid arthritis.

His course in the hospital consisted of treatment with salicylates, penicillin, Sodium Pabalate, thiamine, Aureomycin, infrared therapy, procaine intravenously for pain, and finally cortisone which gave him immediate relief and improvement of all symptoms. Subsequently he moved to New York State and developed intestinal ulcers. He died in 1954, immediately following an operation for the ulcers and from intestinal obstruction.

Case 3. This 57 year old man was first seen on Dec. 13, 1954, for what appeared to be a cellulitis of the third right toe and balanitis, which began a

few weeks earlier. He was given 600,000 units of penicillin intramuscularly, hot compresses, and 750 mg. of Achromycin orally. Three days later he was given another injection of penicillin, and since there was no improvement he was hospitalized for further treatment.

He stated he had developed a sharp pain in his back, on or about Dec. 10, following a blow to the back. The following day his right third toe became red, swollen and painful, and a moist, red, ulcerative lesion developed on his penis. A slight urethral discharge was present but disappeared spontaneously. He was given several injections of penicillin, and cortisone orally, but was not benefited. His left heel and right index finger at this time were tender and swollen. He gave a history of having had a sensitivity reaction to penicillin one year previously. On Dec. 28 there developed an ulcer with a raised red border in the coronal sulcus. He also had a paronychia of the right index finger, and a red, scaling, erythematous, tender dermatitis of the right third toe. This toe was thickened, firm and swollen. There was tenderness of the left sole. He had pain and tenderness in his right flank. He had also developed crusted, discrete, erythematous lesions on the extremities. A diagnosis of generalized, severe, infectious arthritis and of infectious dermatitis with multiple paronychial infections due to the hemolytic staphylococcus albus was made. Staphylococcus bacteremia and bronchiectasis with pneumonitis of the left lower lobe were also diagnosed later.

The blood pressure was normal. He had a moderate exophthalmos. The tonsils had been removed. There was a dorsal kyphosis, moderate pulmonary emphysema, and the heart was slightly enlarged to the left. He had edema (4+) of his right foot and of the left foot (1+). There was an ulcer on the penis. The right index finger was stiff, red and swollen. He had bilateral palmer erythema. He developed tenderness of the lower ribs on pressure at this time.

Laboratory studies. His urine contained albumin. The Fishberg test showed 80% dilution. The Hgb. and RBC were normal. The WBC was 8,050 with 77% segmented cells, 18% lymphocytes, 3% eosinophils, and 1% stab cells. L.E. cell studies were negative. Bleeding time was 30 min., coagulation 8 min. and 13 sec. Platelet count was 216,000 per cu. mm. Albumin-globulin ratio was 1.8; uric acid was 5.6 mg. per 100 cc. The Kahn was negative. All other blood chemical and agglutination studies were negative. Cultures from the paronychia, nails and skin ulcers disclosed hemolytic *Staphylococcus aureus.* Repeated fungal cultures were negative. Six blood cultures were negative between Jan. 17 and Apr. 18. Synovial fluid from an involved joint had 2,430 white cells per cu. mm., 97% segmented cells and 3% lymphocytes. The protein was 5.6 Gm. and the specific gravity 1.022. Sputum revealed *Hemophilus influenzae,* and hemolytic staphylococcus. Blood cultures on one occasion, in February, discloser nonhemolytic *Staphylococcus albus,* coagulase negtaive. Blood counts then began to show a moderate anemia; the white blood counts varied from 8,350 to 19,700 with 1 to 3% eosinophils, segmented cells of 66 to 82%, stabs 2 to 24%, and lymphocytes 5 to 20 per cent. The sedimentation rate was 47 mm. Aspirated marrow was normal. The hemolytic staphylococcus showed sensitivity ot neomycin and chloramphenicol and slight sensitivity to other drugs. The *Hemophilus influenzae* organism was sensitive to Terramycin. A *Staphylococcus albus* organism isolated was sensitive to Terramycin, neomycin, Achromycin, and Aureomycin.

X-ray studies showed the heart slightly enlarged to the left and chronic bronchial disease. The I.V.P. was negative; a spastic colon was found on barium enema.

Course. Osteomyelitis of the first phalanx of the right third toe, and roughening of the terminal phalanx of the right index finger developed early. Infiltration at the left lung base was diagnosed as possible bronchiectasis. Periostitis of the third toe was found and a periosteal reaction of the first phalanx of the second and fourth toes was also reported. A skin biopsy was taken. Subsequently he developed marked despondency and anorexia, and soreness of the left foot. Large amounts of Terramycin orally as well as other antibiotics and steroids were given without avail. He had a low-grade fever through his hospitalization.

The patient was seen by an internist who believed there was a staphylococcal septicemia with arthritis and skin lesions. Chloramphenicol was given on Feb. 28; on Mar. 3 he was given penicillin, 4 million units every 6 hours. The temperature dropped to normal within 2 days. Tenderness to pressure developed over the lower ribs at this time. The temperature varied from 100 to 101° F. Desensitization to hemolytic staphylococcus with vaccine was attempted without success. Large doses of hydrocortisone were administered orally. Colchicine, Ilotycin, Terramycin, Chloromycetin and penicillin were given during his hospital stay.

The patient left the hospital against medical advice to live in a nursing home where he was treated by a chiropractor. He finally died of acute pancreatitis, diagnosed at autopsy by the medical examiner's office.

This man was thought to represent a case of Reiter's syndrome. He had ulcerative balanitis, keratoderma, urethritis, and arthritis, but lacked conjunctivitis. The absence of one of the cardinal signs of Reiter's syndrome is not unusual.

Histopathology

Case 1. The lamellated keratin layer was about 2 mm. thick and contained about one-half of the possible keratohyalin granules. There were a few small areas of more dense nuclear granules which indicated that some of the nuclei from the infiltrate had been carried over to the keratin layer (dried abscesses). The rete was 3 to 4 times its normal thickness, and formed long rete pegs like those seen in hypertrophic psoriasis. There was edema in the dermal pegs with much infiltration and dilatation of capillaries. In the dermis there was also a moderate subacute perivascular infiltrate.

Case 2. The keratin layer was about 500 microns thick and showed so much parakeratosis that there was essentially no granular layer. In a few areas the

nuclear material was so great that it suggested an intraepidermal abscess in the keratin layer. There was much intracellular edema in the epidermis with moderately advanced acanthosis. In the long dermal pegs there were dilated capillaries and a moderate infiltrate (Fig. 1).

Case 3. The surface was covered by a dry purulent crust, which was about 1 mm. thick. This was mixed with areas of hyperkeratosis and parakeratosis. The rete showed moderate acanthosis with long pegs. In the dermal papillae there was edema, dilated capillaries and a subacute infiltrate. In the upper cutis there was a similar subacute infiltrate and slight fibrosis.

The histologic changes suggest that the histology of keratosis blennorrhagica is essentially a hyperkeratosis with marked parakeratosis. Many inflammatory cells and nuclei extend into the keratin layer. Beneath this the granular layer is decreased or lacking. There is usually some evidence of edema in the epidermis primarily portrayed as intracellular edema. There tends to be a fairly high grade acanthosis with long dermal pegs in which there are dilated capillaries and a subacute infiltrate. In the upper cutis there is marked edema and a subacute infiltrate. The picture is similar to that of hypertrophic pustular psoriasis and suggests that the lesions are not really keratosis, but parakeratosis as suggested by Lord and Zeligman.

FIG. 1

(Case 2) Low Power. This shows a layer of hyperkeratosis about 1 mm. thick with much parakeratosis; in fact, the parakeratosis is so prominent one can hardly call it a keratosis. In the parakeratotic layer there are also dried up abscesses. The granular layer is missing, but in this area there is much perinuclear vacuolization. In the epidermis there is not much evidence of exocytosis. The dermal pegs seen are long and narrow with open capillaries and contain a mild infiltrate. The picture is essentially that of a hypertrophic psoriasis with much parakeratosis and evidence of dried up abscesses in the keratin layer.

Discussion

Histopathology. The following is a composite picture of the histopathology of keratosis blennorrhagica sine blennorrhea.

The keratin layer is usually greatly thickened, occasionally up to several millimeters. There is usually marked parakeratosis with lamellated layering. Large areas of parakeratosis are usually lacking. There are also many nuclear fragments of infiltrative cells carried over into the horny layer. These usually have dried, and due to the increased density of nuclear material, give the appearance of a "dried-up" abscess. The rete usually shows marked acanthosis, resembling hypertrophic psoriasis, and there is often more evidence of edema. Small intra-epidermal and edematous rete pegs may be present. Areas of increase in the granular layer are present, especially over the more horny plugs. There is a variable amount of exocytosis and edema in the rete.

In some of the more florid types of keratosis blennorrhagica sine blennorrhea there may be small frank abscess formation in the epidermis, either in the rete or in the keratin layer. In the papillary pegs (which may be long and rigid as in psoriasis) there is usually dilatation of capillaries with a mild subacute infiltrate. The subacute infiltrate is also present in the papillary layer and in the subpapillary layer associated with moderate dilatation of capillaries.

Because there is usually no pure keratosis but always a diffuse parakeratosis, the dermatologic phase of Reiter's syndrome should be called parakeratosis blennorrhagica sine blennorrhea and not keratosis blennorrhagica sine blennorrhea.

Lord and Zeligman[1] stated that they did not know of any other dermatosis in which may be seen such massive parakeratotic formations which remain in this half-formative stage. The changes do not reach the final

hard, dry type of cornification but retain the close clinical appearance of waxy, soft, homogeneous, parakeratotic deposits. Parakeratosis is marked here and there with an intact granular layer. The histologic picture usually shows edema of the epidermis with swelling of the rete cells and dilatation of the intracellular spaces, especially of the stratum corneum. The cutis shows an acute infiltrate of small mononuclear leukocytes and plasma cells with a variable number of polymorphonuclears. Gonococci were reputedly found in the keratotic lesions of 10% of 106 cases.[8]

Clinical picture. Ford[9] stated that Reiter's syndrome refers to the triad of arthritis, urethritis and conjunctivitis, and that in spite of inadequacies, it should be restricted to this symptom complex. The syndrome frequently follows an attack of dysentery. He said that when Reiter's syndrome is of venereal origin, it has been confused with gonococcal arthritis. In the latter one should be able to prove the etiology; since the advent of the antibiotics gonorrheal arthritis has become very rare. Especially important diagnostic aids are studies of the urethral discharge and examination of the synovial fluid (which may contain up to 50,000 leukocytes per cu. mm.).

Ford concluded that Reiter's syndrome appears to be caused by an infectious agent which gains entry through the intestinal tract or urethra and may be transmitted by coitus.

The reddened, slightly elevated, patchy lesions on the glans (characteristic of circinate balanitis), the superficial reddened mucosal patches in the mouth (usually on the palate), and the hyperkeratotic lesions on the soles and palms are the earliest manifestations of keratoderma blennorrhagica. These changes are all found in Reiter's syndrome with variable frequency.

Ford believes that there is no direct evidence that the responsible agent is a virus, and the hypothesis that pleuropneumonia-like organisms are the causative agents, requires much more supportive evidence. He states that the finding of gonococci in the urethral discharge alters the diagnosis to "Reiter's disease following gonococcal urethritis" rather than "Reiter's disease following diarrhea."

The original concept of keratoderma blennorrhagica required the presence of gonococcal urethritis. In many instances it has been reported that gonococci were found in joint cavities and in skin lesions, by microscopic examination and culture.

The original concept of the relationship of keratoderma blennorrhagica to gonorrheal urethritis has been disproved by many published reports during the past 30 years.[1,5-10] It has been demonstrated conclusively that lesions of keratoderma blennorrhagicum can occur as part of Reiter's syndrome and that this condition may occur in the absence of gonorrheal infection. The urethritis may be due to nonspecific organisms, such as the pleuropneumonia organisms. Dysentery may be the cause of Reiter's syndrome and may be due to Shiga, Shigella or Flexner organisms. The symptom-complex of arthritis, conjunctivitis, urethritis, and circinate balanitis, all may appear in Reiter's syndrome.

Keratoderma blennorrhagicum, with its parakeratosis, is apparently a cutaneous reaction which can appear either as a complication of gonorrheal urethritis or as a cutaneous manifestation of Reiter's syndrome. It may develop secondary to infection caused by other organisms infecting either the urethra or the intestinal tract. Keratoderma blennorrhagicum is apparently a nonspecific cutaneous reaction and the occurrence of these lesions can mean that the individual has a bacterial infection of the urethra, the intestinal tract or some other part of the body.

Since ultimate spontaneous remission occurs, any type of treatment is difficult to evaluate. Supportive measures should be used. If the arthritis is severe, suppression of symptoms may be obtained by the administration of 100 to 200 mg. of cortisone or its equivalent daily.

Conclusions

1. Cutaneous lesions of keratoderma blennorrhagicum may develop in the absence of gonorrheal infection, but in association with other infectious organisms.

2. Keratoderma blennorrhagicum-like lesions may occur in association with Reiter's syndrome.

3. Parakeratosis rather than keratosis is the histologic picture in keratoderma blennorrhagicum regardless of etiology.

4. The simple term parakeratosis of

Reiter's syndrome is more descriptive and should be substituted for the term keratosis blennorrhagica sine blennorrhea.

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Discussion (Abstract)

Dr. Harvey Blank, Miami, Fla. Before discussing this interesting paper, it might be worth mentioning that the word "blennorrhea" literally means "a discharge from the mucous surface." Inclusion blennorrhea is a disease caused by a virus which produces conjunctivitis especially in the newborn, and endocervicitis in the adult female, and possibly urethritis in the adult male. The word blennorrhea, however, usually means gonorrhea, and therefore this paper by Ellis and Bereston could be reworded as "Reiter's syndrome versus gonorrheal keratosis without gonorrhea." It probably is helpful to use more precise terminology because of the two meanings of blennorrhea and the fact that nongonococcal blennorrhea may have significance in patients who develop keratoses but are not infected with gonococci.

Ellis and Bereston have given us the benefit of their detailed studies of three very interesting patients. Whether they can get other writers to accept their classification of keratosis blennorrhagica as a part of Reiter's syndrome, or whether this is even desirable as long as the etiology of both conditions is unknown is a moot question. In 1893, Vidal (quoted by Shelley and Crissey, Classics in Clinical Dermatology, Charles C. Thomas, Publisher, Springfield, Ill., 1953, p. 257) described the syndrome of keratosis blennorrhagica as a generalized keratotic skin lesion associated with arthritis which followed gonorrheal urethritis. Reiter, 23 years later, described a different triad of urethritis, arthritis and conjunctivitis in which no gonococci were found and no skin lesions were noted.

As Ellis and Bereston state, there has been an increasing number of reports in recent years of lesions of keratosis blennorrhagica in patients in whom gonococci could not be demonstrated. Since the report of Wiedmann's paper in 1934, many of these cases have been interpreted as examples of Reiter's syndrome with skin lesions of keratosis blennorrhagica. Hall and Finegold (A Study of 23 Cases of Reiter's Syndrome, Ann. Int. Med. 38:533, 1953) found cutaneous lesions in all 23 of their patients with Reiter's syndrome, 5 of whom developed the generalized lesions of keratosis blennorrhagica. In the series reported by Foxworthy and colleagues (ACTH and Cortisone in Treatment of Severe Reiter's Syndrome, Ann. Int. Med. 44:52, 1956), 9 of 10 patients with Reiter's syndrome developed skin manifestations and 4 of these patients had lesions identical to those of keratosis blennorrhagica. The most common skin lesions found in Reiter's syndrome are balanitis circinata and perimeatal erosions.

Although the cause of this syndrome is not known, as Ellis and Bereston noted, several bacterial agents have at times been associated with the condition. The majority of cases with lesions of keratosis blennorrhagica have been preceded by gonococcal urethritis. Mention has also been made of the possible role of Flexner or Shiga bacilli or pleuropneumonia organisms.

However, against the specific gonococcal or bacterial etiology of this condition is its lack of consistent response to specific antibacterial therapy. Dr. Joseph Albert, of our department (Albert, J., and Crone, R. I.: Keratosis Blennorrhagica and its Treatment, A.M.A. Arch. Dermat. [in press]), found that antibiotics did not alter the natural course of this condition. Keratosis blennorrhagica is usually self-limited but can be very severe and has even caused a few deaths. The corticosteroid hormones are not curative but if given in large amounts will aid recovery by improving the arthritis and general well-being of the patient. At present they are the best agents available for the treatment of severe cases. Triamcinolone is probably the drug of choice.

Dr. Ellis (Closing). When Dr. Lord presented the paper on Reiter's disease (which contained Case 1 of this report), he had 167 references.

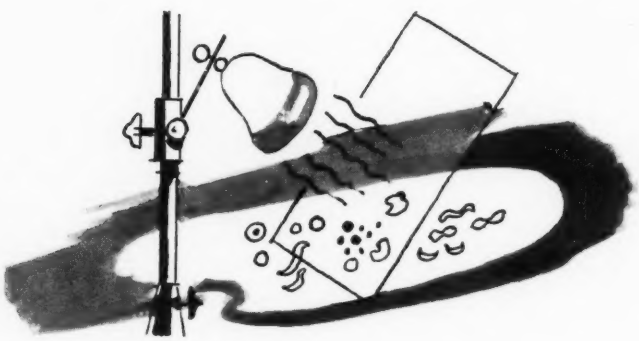
Today the Journal will publish papers with only 20 references. Since there are approximately 20 references each year on this disease, it is impossible to cite them all in this report.

Just because an author has reported a syndrome with certain features as reported by Reiter, with arthritis, conjunctivitis, stomatitis and diarrhea and balanitis, the fact that there is urethritis does not rule out this syndrome. One is reminded that incontinenti pigmenti was first reported as a pigmentation of an unusual type, and later it was found that this stage is preceded by a hyperkeratotic stage and, going back to the original eruption, a vesicular stage. As Dr. Cohen pointed out recently, there may be 20 complications or more of this disease, most of which are on a neurogenic basis.

Dr. Blank has pointed to the lack of response to antibiotics and suggested it has a self-limited course. In a report from the Veterans Administration the author stated that the course usually lasted about 70 days, but the patients stayed in the hospital about 85 days.

We wish to stress that the cutaneous lesions are not keratotic lesions but really represent a parakeratosis. Until more is known about the syndrome, it is just as well to use the popular term Reiter's syndrome, instead of the cumbersome term as was used originally.

We wish to thank the discussors and especially wish to thank Dr. Blank for his slides which showed very well the hyperparakeratotic lesions and how these lift the nail from their beds.



A Reconsideration of Allergy and Nasal Surgery*

RALPH H. RIGGS, M.D., *Shreveport, La.*

Anatomic and physiologic considerations are important in the evaluation of allergic rhinitis, with or without accompanying infection. These are basic considerations as surgical treatment is planned and carried out.

DURING THE PAST DECADE little has been published concerning allergy and nasal surgery as compared with the previous 10 years when removal of polyps and operations on the nasal sinuses were the main operative procedures discussed. Occasionally, the septal operation was mentioned as a last resort to "help in breathing." However, since Cottle and Loring's[1] presentation of newer concepts of nasal physiology and their relation to reconstructive surgery of the nose, including the septum, it seems advisable to reconsider allergy and surgical procedures on the nose. It is difficult to bring basic rhinologic problems into proper perspective, but this is of tremendous significance and it is incumbent upon us to realize the urgency of re-evaluation.

According to Hansel,[2] in 1871, Voltolini cured a patient of bronchial asthma by removal of a nasal polyp. This was probably the beginning of nasal surgery in allergic patients. Although nasal allergy was recognized about 1906, the allergic etiology of disease of the paranasal sinuses was not recognized until about 20 years later. Little was added to septal surgery and rhinoplasty between 1910 and 1940, although the first decade of this century was filled with many brilliant contributions to both of these subjects.

Most of us have seen patients with asthma obtain relief after surgical treatment of an infected sinus or removal of polyps.[3] Yet, in the past, some rhinologists became rather antagonistic toward the use of such procedures. Time has proved that if these patients have a real allergy, further care by an allergist is imperative.[4] Some medical men have considered the "shock" of an operation to be a possible explanation for the improvement. Many rhinologists have seen allergic rhinitis develop in some patients after nasal operations. It is generally believed that there must be a definite correlation between allergy and nasal surgery, and that any nasal operation may be allergenic in nature.

Malformations that distort the normal anatomic relationships may cause obstruction to breathing, as may allergic reactions or infections that swell the membranes and close or narrow the passages. However, some patients in whom infection, obstruction or definite allergies cannot be demonstrated have symptoms related to such conditions. Only after careful examination should we label these persons as neurotics and send them off with tranquilizers.

Examination and Diagnosis

A thorough rhinologic examination should include, first, inspection of the external pyramid; the rhinologist should note sagittal asymmetry, the relationship of the bony vault and cartilaginous vault to the lobule, and the relationship of the nose to the patient. Next, the vestibule, the area in which the air is prepared to enter the nose proper (internal nose), should be examined with retractors, not the speculum. Basic knowledge of the anatomy of this region is important. (For an excellent discussion of the structure and function of the nasal vestibule Cottle's[5] article on this subject should be consulted.) The membranous septum should be freely movable and without tension or retraction. The floor of the nose and pyriform crests should be examined for asymmetry, which sometimes results from early injury or some disturbance in growth. Finally, the examiner should inspect

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the upper lateral cartilages which, with the septum, form the valve through which the air enters the nasal chambers. To examine this area without distortion is important because one must note the relationship of the septum, upper lateral cartilages and cartilages of the lobule.

It is also important that the examiner note the space between the septum and lateral walls, for instead of mechanical obstruction there is a real possibility of too much room in the nose. In such cases the patient frequently complains of poor breathing and sometimes nasal allergic reactions, even asthma.[6] I have records of such cases in which adequate nasal operations helped to provide great relief (Fig. 1).

Recently, Cottle and associates[7] enumerated other examinations that may help in understanding the functional capacities of the nasal apertures and external pyramid. These include measuring the thickness of the septum, nasal index, tip index, rhinomanometry and rhinosphygmography.

Because the diagnosis of basic nasal dysfunction is frequently difficult to make, the treatment used may not give the desired or anticipated result. Causes must be sought in many categories. Cottle has used the pedagogic device of alluding to the five vowels of the alphabet in listing the topics that must be considered in this connection.

- A stands for allergy
  accessory sinuses
  atmosphere
  adenoids
  atrophy
  autonomic dysfunction
- E emotion
  endocrines
  exhaustion
- I infection
  inflammation
- O obstruction—nasal, as well as any other part of the respiratory tract
- U stands for the total personality, for metabolic problems, all that one eats, drinks, smokes, sleep, and habits; who this patient is, and also *you* the physician, who you are, and the interpersonality relationship of the patient.

A septal operation may be unsuccessful for surgical reasons. The surgeon may not have adequately considered the relation of the septum to other parts of the nose, especially the lobule and the valves. Injuries inflicted upon the nose during operations considered to be fairly good procedures, resulting in perforations or severe atrophy, may not be noticed until many years later. These, especially if coupled with slight injuries to the nose, produce in lesser or greater measure one or more of the four mechanical complications of nasal trauma: sagging of the cartilaginous vault, retraction of the columella, ballooning and returning of the upper lateral cartilages, and flattening of the tip.[8]

Resistance to the air stream is an extremely important function of the normal nose,[9] both on inspiration and expiration. It is possible to conclude that each time air is inspired it makes one or two whirls, so that the air remains longer in the nose and therefore better ventilates the intra-nasal structures. It is equally easy to assume that by slowing down the rate of air-flow and the creation of eddies of air the particles of atmospheric dust and pollens may not only be filtered out in the area of the vestibule, but also be deposited in the adequate area in the posterior aspect of the nose and pharynx and thus allow a smaller concentration to come in contact with the nasal mucosa. This may play a role in allergic rhinitis.

Disturbances in the nose may be an expression of disturbed physiology rather than the

FIG. 1

This patient, aged 43 years, complained of nasal obstruction, postnasal discharge with crusting, headaches, roaring in the ears and sleeping poorly, requiring use of three pillows. Previous operations on the septum and external sinus failed to relieve these symptoms. My operation, which included narrowing of the nasal cavities and procedures on the lobule and upper lateral cartilages, resulted in almost complete relief. The patient subsequently had few complaints and slept well, requiring only one pillow.

result of evident pathologic lesions. Abnormal nasal anatomic relationships do not necessarily cause nasal dysfunction; however, when the malformation involves certain functional areas, it may produce a number of rhinologic symptoms.[10]

Holmes and associates[11] described nasal syndromes that they attributed to life situations producing conflicts, anxiety, hostility, guilt and feelings of frustration and resentment. These emotions were often associated with nasal hyperfunction and hyperemia, swelling of the nasal mucosa, hypersecretion and obstruction to breathing in the nose. Pain commonly accompanied the nasal hyperfunction. It extended under the bridge of the nose over the zygoma, in and above the eye, temple, upper teeth and ear. Infection of the nasal spaces were not necessarily a prerequisite for pain. Among 100 of their patients it was often possible to correlate the occurrence of chronic nasal symptoms with psychic conflicts. Wolf[12] claimed that he was able to produce or relieve the symptoms of hay fever in some of his patients by discussion of personal problems. The patterns of disturbance of nasal function described in Wolf's report appear to have biologic significance, as an attempt of the organism to deal with or ward off a threat. If such a pattern exists for a long time, pathologic changes occur which may become important to the pathogenesis of chronic nasal disease. This does not mean that all nasal disease stems from situations involving difficulties in interpersonal and social adjustments, but such possibilities certainly must be considered before a diagnosis is made.

In studying nasal dysfunction the rhinologist must consider the autonomic nerve supply. Mitchell[13] considered division of the nervous system into somatic and autonomic components to be artificial, although such a classification is convenient for descriptive purposes. These parts of the nervous system are not separate entities. They originate from common primordial cells, they develop together, they are built up from the same basic units or neurons associated in similar reflex arcs, they comprise central and peripheral parts, and structurally they are always related and often closely connected. Mitchell stated that the belief that the autonomic part of the nervous system is merely a peripheral efferent mechanism should be discarded, for it is represented at every level in the central nervous system, although still not widely recognized. This basic fact explains why visceral and vascular disturbances may follow cerebral lesions or emotional upsets. Thus, some processes commonly regarded as psychologic or emotional, and due to abstract mental processes, may be the result of abnormal efferent autonomic impulses on visceral and vascular structures, which in turn produce disordered motor or sensory effects. If one keeps in mind that ramifications of the first, fifth, seventh, ninth and tenth cranial nerves are closely intertwined, it is not difficult to understand that many abnormal neurologic reflex disturbances may occur. A better understanding of nasal physiology generates more respect for preservation and restoration of nasal function.[14]

Proper nasal function may also be affected by a number of other conditions, for example,

FIG. 2

This 18 month old child had nasal obstruction and continuous infection of the upper respiratory tract necessitating use of antibiotics every week since birth. The child was nervous and restless while sleeping. The I.Q. was questionable. At operation 3 septums were found. The 2 lateral ones, most probably paraseptal cartilages, were removed. Postoperatively, nasal obstruction was relieved and the baby was no longer nervous, sleeping well all night. The child took afternoon naps and acted "normal."

a twisted nose, saddle-nose, deformed lobule, long nose and drooping tip.[15,16] A large hump can alter the eddying of the air. Dislocation of the caudal end of the septum and a depressed tip are frequently encountered, and operation on the septum alone will not correct these conditions. Proper direction of air currents, the intensity of the flow, and the amount of air that may flow through the nose in a given length of time provide different considerations to act as a guide in selection of patients for nasal surgical procedures and to help decide whether an operation on the septum, external pyramid, or some combination thereof is indicated.[17]

Treatment

Allergy requires one kind of treatment, infection another, and disturbed anatomic relationships (or physiologic) still another. The mere presence of allergy is not a surgical contraindication if an operation is needed; neither is age. I, among others, have operated on infants younger than 2 years of age for inadequate breathing and accompanying conditions, such as frequent or continuous colds (which may be partly an allergic condition) (Fig. 2). Diseases of the middle ear and intermittent infections in the throat are common. Also, many of these children have difficulties referable to the lower respiratory tract.

In nasal operations on a given patient, our aim is to recreate or refashion the nose that has a bony vault, a cartilaginous vault and a lobule so the patient will have the best possible nose for breathing and smelling. To accomplish this all nasal structures must be thoroughly evaluated before and during operation, and the adjacent structures must be refashioned and remolded to create a proper harmonious whole. Only in this way will the nose function as an integrated organ. The patient with nasal allergy needs good ventilation and drainage and the nearest approach to a normally functioning nose that we can provide for him. Best results can be obtained by combined medical and operative measures and complete cooperation between the allergist and rhinologist.

Summary

Since the presentation of newer concepts of nasal physiology, and their relation to reconstructive nasal operations, reconsideration of allergy and nasal operations seems advisable. Patients with allergic conditions should have a thorough rhinologic examination if a correct diagnosis of the basic nasal dysfunction is to be made. It is often extremely difficult to make the correct diagnosis. Among the etiologic factors to be considered are allergy, accessory sinuses, atmosphere, adenoids, atrophy, autonomic dysfunction, emotions, endocrines, exhaustion, infection, inflammation, respiratory obstruction and the total personality. Treatment can be successful only if the correct diagnosis is made. Best results can be obtained by combined medical and surgical measures and complete cooperation between the allergist and rhinologist.

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Anesthesia for Cortical Excision in Focal Seizures*

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It has been customary to use local anesthesia in operations for excision of cortical tissue for convulsive seizures. However, the authors describe the use of general anesthesia for such operations when circumstances are such as to contraindicate the use of local anesthesia.

A SMALL PERCENTAGE OF PATIENTS, suffering from symptomatic or focal epileptiform seizures are uncontrollable even with the most advanced anticonvulsant therapy but may benefit from cortical excision. Usually this procedure has been performed under local anesthesia to permit reproduction of the aura or seizure by electrical stimulation. Local anesthesia also permits surface or depth recordings of cerebral rhythms undistorted by drugs.[1] General anesthesia is required in patients who are too young or unable to cooperate. The use of general anesthesia makes reproduction of the aura impossible, and when some general anesthetics are used the electrocorticogram may be so distorted as to be of little or no help to the surgeon.

During the routine investigation of a new technic of anesthesia, it was noted that a "near-waking" pattern was maintained throughout the course of anesthesia. This observation led to the use of this technic in 6 patients who needed cortical excision but could not be managed under local anesthesia.

Technic

Induction is accomplished with a small amount of 2% thiamylal (Surital). When the eyelid reflex is lost, a rapid infusion of 0.2% succinylcholine (Anectine) in 5% glucose and distilled water is begun and continued until complete muscular paralysis is obtained. The drip is then slowed. Respirations are assisted and then controlled as apnea occurs. At this point an endotracheal tube is inserted and analgesia maintained with a mixture of three liters of nitrous oxide and one liter of oxygen. Apnea is maintained through intermittent administration of succinylcholine and lowered carbon dioxide tension resulting from hyperventilation.[2] This technic has proved satisfactory in over 20,000 cases, for nearly all types of surgery and in all age groups except the extremely young. Use of this technic in infants is limited by the difficulty in venipuncture.[3]

A comparison of the electroencephalographic patterns in the awake and anesthetized subject is shown in figure 1. Figure 1, A shows the normal waking pattern in a healthy young adult who is breathing room air. Figure 1, B shows the same subject now totally paralyzed and under controlled ventilation with 100% oxygen. Both tracings consist of well modulated 10 per second alpha waves intermixed with minimal 25 per second beta waves. In figure 1, C is seen the electroencephalogram 90 seconds after the injection of 200 mg. of thiamylal. There is an increased amplitude in the 20 to 22 per second beta waves followed by low and medium voltage, bilateral 5 to 7 per second waves in all head regions. There is minimal activity in the 8 to 12 per second alpha range. These changes are characteristic of light sleep, after the maximum effect of the barbiturate has passed. The stabilized state of nitrous oxide sleep is seen in figure 1, D where high voltage 25 per second beta waves predominate, intermixed with some 1 to 15 per second alpha wave activity. Spindles appear from time to time. Figure 1, E shows the changes that occur four minutes after reducing the oxygen content of the respired mixture to 10 per cent. Hypoxic changes in the electroencephalogram were indicated by

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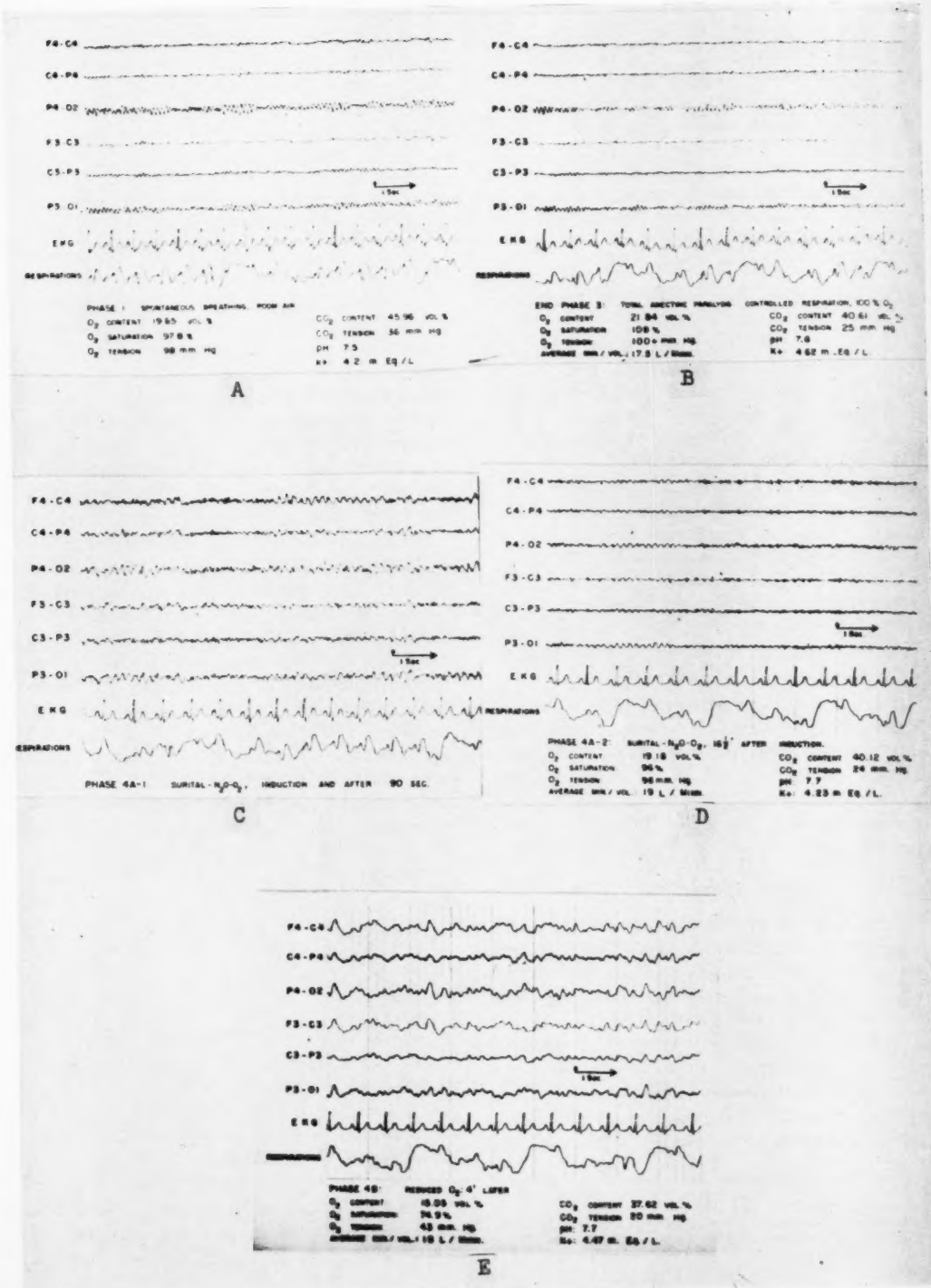
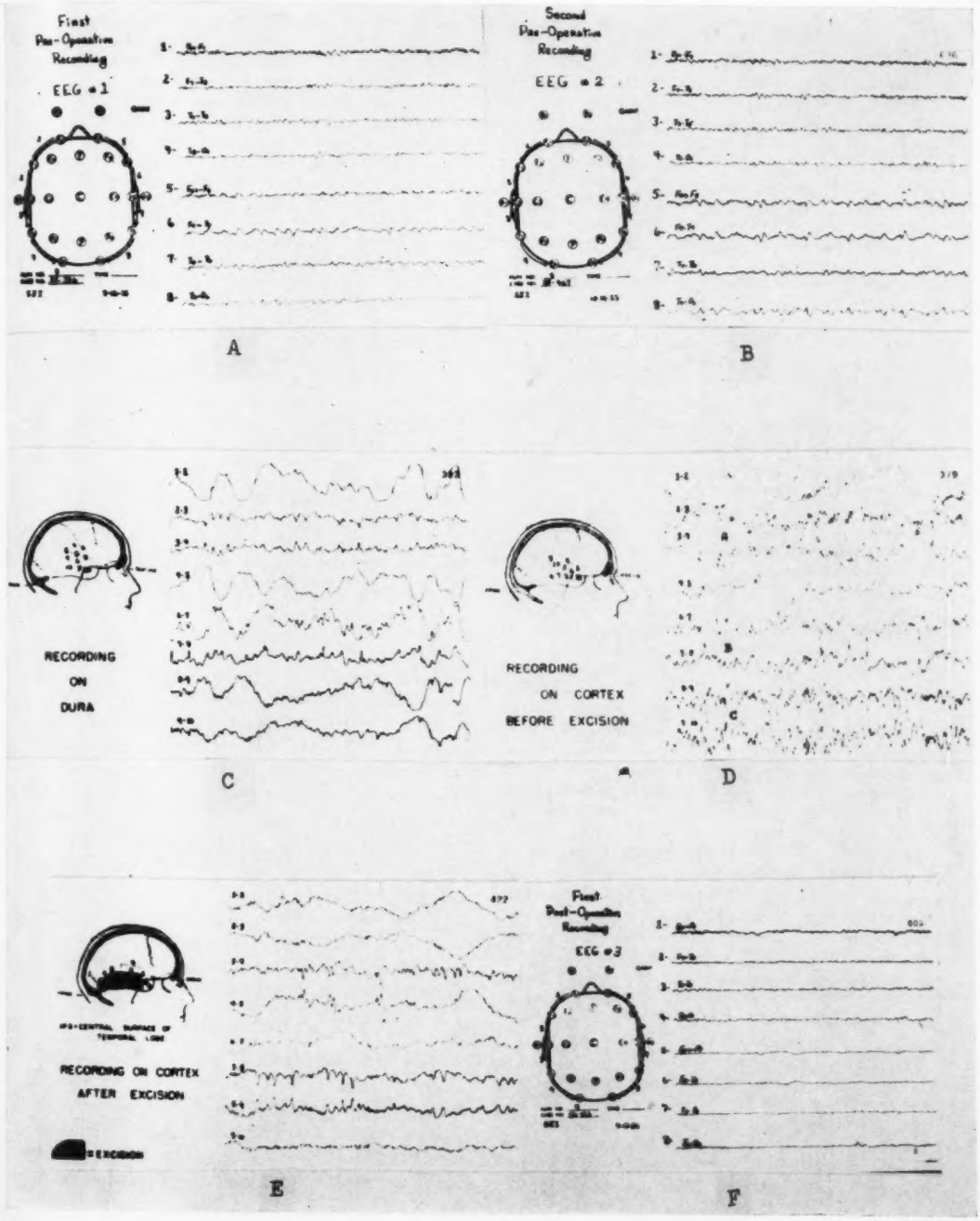
FIG. 1


F4-C4
C4-P4
P4-O2
F3-C3
C3-P3
P3-O1
EKG
RESPIRATIONS
1 Sec
PHASE 1 SPONTANEOUS BREATHING, ROOM AIR
O2 CONTENT 19.65 VOL %
O2 SATURATION 97.8 %
O2 TENSION 98 mm HG
CO2 CONTENT 45.96 VOL %
CO2 TENSION 36 mm HG
pH 7.5
K+ 4.2 m EQ/L
A
END PHASE 3: TOTAL ANECTINE PARALYSIS CONTROLLED RESPIRATION, 100 % O2
O2 CONTENT 21.84 VOL %
O2 SATURATION 100 %
O2 TENSION 500+ mm HG
AVERAGE MIN/VOL 17.5 L/Min.
CO2 CONTENT 40.61 VOL %
CO2 TENSION 25 mm HG
pH 7.6
K+ 4.62 m.EQ/L
B
PHASE 4A-1 SURITAL-N2O-O2, INDUCTION AND AFTER 90 SEC.
C
PHASE 4A-2: SURITAL-N2O-O2, 15' AFTER INDUCTION.
O2 CONTENT 19.18 VOL %
O2 SATURATION 96 %
O2 TENSION 96 mm. HG
AVERAGE MIN/VOL 19 L/Min.
CO2 CONTENT 40.12 VOL %
CO2 TENSION 24 mm. HG
pH 7.7
K+ 4.23 m EQ/L.
D
PHASE 4B: REDUCED O2 4' LATER
O2 CONTENT 18.09 VOL %
O2 SATURATION 94.9 %
O2 TENSION 93 mm. HG
AVERAGE MIN/VOL 18 L/Min.
CO2 CONTENT 37.62 VOL %
CO2 TENSION 20 mm HG
pH 7.7
K+ 4.47 m. EQ/L
E

the appearance of bilateral slowing with 6 to 7 per second activity in all head regions. There is continuous medium voltage 5 to 7 per second activity decreasing slowly in amplitude and diminishing in frequency until the record shows high voltage, 1½ to

FIG. 2



3 per second activity. With this technic the electroencephalogram gives the most sensitive index of cerebral hypoxia.

Case Reports

Six patients have been anesthetized with this technic for cortical excision. Two of the typical cases are presented here.

Case 1. L. M., a 14 year old girl, entered the hospital with a diagnosis of postencephalitic state, diffuse maximal brain atrophy in the right temporal region, with focal cerebral seizures apparently emanating from this source. This condition was the result of influenzal meningitis at the age of six. Her seizures had begun 6 months following this disease and at the time of admission she had one to twenty-five major seizures per day in spite of Mysoline 250 mg. and phenobarbital 0.13 Gm. 6 times per day. On a previous admission, electroencephalograms and a pneumoencephalogram had been performed to localize the focus. Figure 2, A shows the first preoperative EEG with a minimal but definite focal epileptiform discharge in the right mid-temporal region (T-4) corresponding to the area of maximal brain atrophy as demonstrated on the pneumoencephalogram. Figure 2, B shows the second preoperative recording which is almost identical to the first.

After premedication with ordinary dosages of meperidine and scopolamine, anesthesia was induced in the manner described and a right temporal osteoplastic flap turned. Figure 2, C shows the first recording made on the dura; maximal disturbance is seen at point 7 in the form of repetitive random sharp waves and spikes which are consistent with the preoperative recordings indicating the focal temporal epileptiform discharge. There are no typical sleep spindles nor does the record have the characteristic appearance of nitrous oxide analgesia. Increased amplitudes are the result of direct cortical recording. In addition, there was a diffuse dysrhythmia. Figure 2, D is the electrocorticogram showing active high voltage spiking discharges to be greatest at points 7 and 9. The discharge thus was seen to involve the entire temporal region and to spread to a lesser extent to the adjacent inferior central, precentral and posterior inferior frontal regions.

Excision was carried out as indicated in figure 2, E. Most of the inferior and middle transverse temporal gyri were removed to the temporal horn of the right lateral ventricle. The inferior tip of the temporal lobe was spared. Circulation to the superior transverse temporal gyri and adjacent frontal and central regions was not disturbed. The corticogram shows that spike activity continues with diminished amplitude around the edges of the excision at points 4 and 8.

Figure 2, F is the EEG taken 3 months after operation. This patient is now free of major seizures on minimal doses of Dilantin.

Case 2. J. G., a man aged 24, entered the hospital with a diagnosis of focal cerebral seizures emanating from the left temporal region, cause undetermined. On a previous admission the usual pneumoencephalogram, carotid arteriogram, and electroencephalograms had been performed. As shown in figure 3, A and B there are demonstrated a focal abnormality, maximal in the left mid-temporal region (T-3), which demonstrates epileptiform characteristics similar to those in the previous case. There is focal slowing, maximal in channels 2 and 3 intermixed with some 4 to 7 per second activity. Figure 3, C is a preoperative waking record, all medication having been discontinued and figure 3, D is a record taken during spontaneous sleep. Both show a similar discharge to the previous records, with phase reversal and some abnormal activity in the left posterior inferior frontal region.

Since this patient was uncontrolled by maximum dosages of anticonvulsants, exploration was elected. Anesthesia was induced in the usual manner and figure 3, E shows the corticogram made after the dura was opened. Here is seen 10 to 11 per second activity closely resembling the waking pattern. No epileptiform activity was demonstrated at rest, partly because anticonvulsants had not been discontinued on the night before operation. In order to elicit epileptiform activity, Metrazol 250 mg. was given slowly by vein. Figure 3, F is the corticogram obtained shortly after administration of this drug. The development of multiple rhythmic sharp waves and spikes with the points of reversal marked by the "X" may be noted. These waves were found to arise, not from the superior transverse temporal gyrus as expected, but from the inferior precentral region in what appeared to be the motor speech region of the dominant hemisphere. This was repeated with serial injections of Metrazol with the same result. Since the spike discharge could be obtained only in the motor speech area, it was elected not to perform an excision, this being the dominant hemisphere.

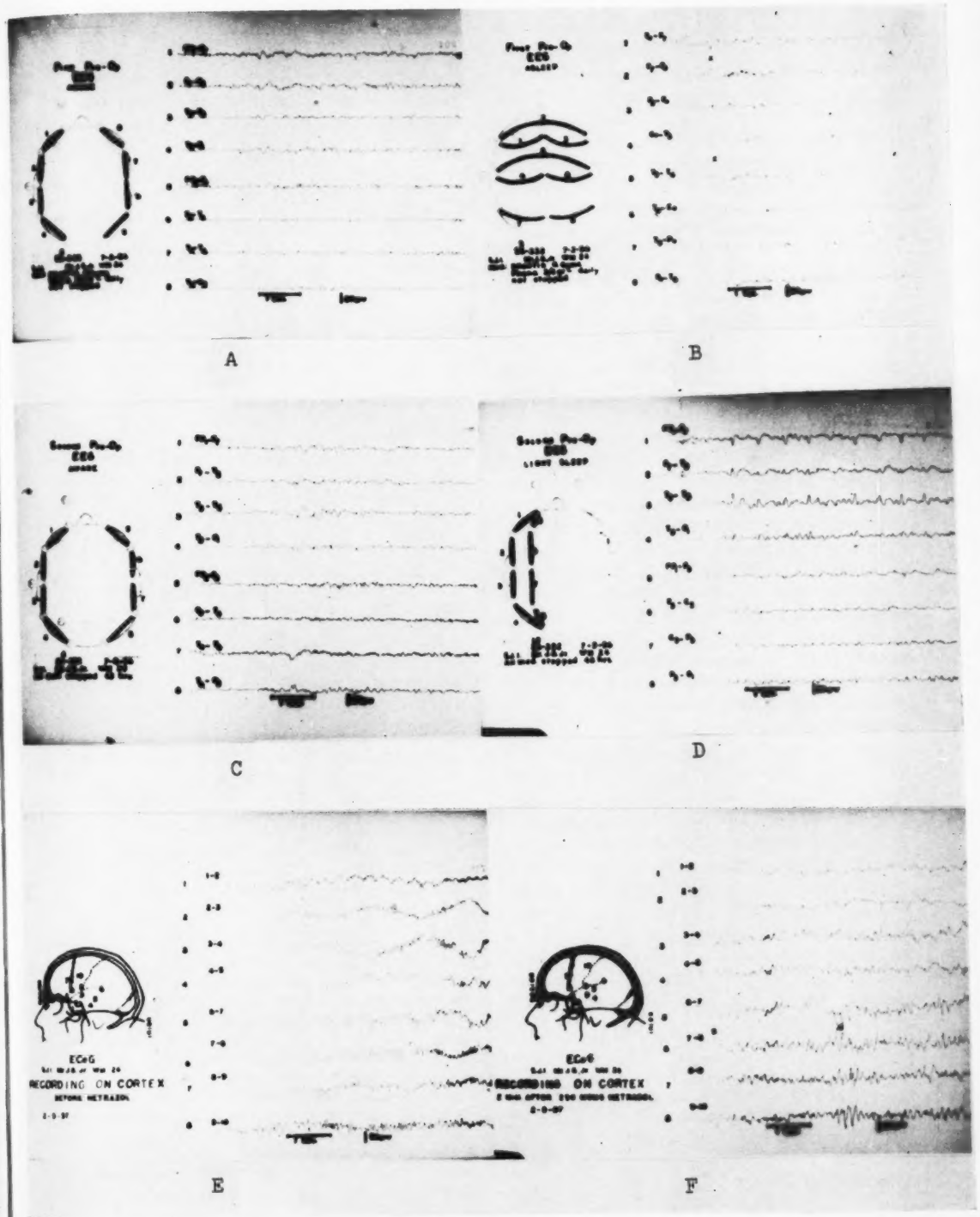
Results

Six patients have been managed in this manner. One required hemispherectomy and succumbed several months postoperatively from meningitis following ventricular drainage for hydrocephalus. In one case cortical excision was not performed because of the probability of a subsequent motor speech deficit. Of the remaining 4 patients, one is completely without seizures and the other 3 are readily controllable on minimal dosages of anticonvulsant drugs. In no instance have these patients shown complications as a result of anesthesia, all having awakened promptly as might be anticipated with the light degree of depression produced.

Discussion

Those epileptics refractory to medical therapy must be evaluated thoroughly to select the ones suitable for cortical excision. Diagnostic procedures should include pneumoencephalography, carotid arteriography and at least two electroencephalographic

FIG. 3



tracings, both with and without medication. If a discrete epileptogenic focus is thus demonstrated and it is consistent with the clinical history, operation may be feasible. It cannot be too strongly emphasized that the diagnostic procedures outlined are the essential minimum and must be correlated with historical and clinical data.

There can be no question that local anesthesia is the method of choice for this operation since it allows the added advantage of further checking the focal location by the reproduction of the aura and study of afterdischarge. However, the sudden occurrence of a major seizure is always possible and the administration of drugs to control this occurrence is extremely hazardous when the airway is somewhat inaccessible. In addition, the patient is generally uncomfortable even with the most skilled administration of the local anesthetic agent.

Aside from the inability to reproduce the aura, it is demonstrated by this experience that it is possible to properly locate and excise the epileptogenic focus under general anesthesia. This method also offers the additional advantage of the muscular paralysis produced by succinylcholine. Metrazol may be administered rather freely to bring out latent epileptiform activity without endangering the patient with an induced clinical seizure. An electrical convulsion within the brain can be produced safely while skeletal muscles are paralyzed.

This technic of anesthesia is suitable for all age groups. In the extremely young a cutdown is essential, and in all age groups primary attention must be given to adequate ventilation. In any circumstance adequate analgesia and amnesia without depression is highly desirable. The stability of the cardiovascular mechanism under these circumstances and the absence of prolonged recovery times make this technic most applicable to the older age group. So far, no absolute contraindications to its use have been demonstrated.

Summary

1. A technic of general anesthesia which lends itself to the adequate performance of cortical excision in focal epilepsy has been presented. Details of the technic have been reported elsewhere.

2. Two illustrative cases have been discussed and the results in 6 cases summarized.

3. Although local anesthesia is distinctly the method of choice for this operation, the form of anesthesia herein presented would seem to be adequate in instances where local anesthesia cannot be utilized.

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Discussion (Abstract)

Dr. R. C. Llewllyn, New Orleans, La. I rise to compliment Dr. Rumble for his excellent presentation of a new technic to aid the neurosurgeon. An improved method of anesthesia has been needed for cases, as described in this paper, who cannot tolerate local anesthesia. Dr. Rumble has had extensive experience using controlled apnea with succinylcholine. The technic employs complete apnea throughout the operation giving the anesthesiologist absolute control of the ventilatory depth and cycle. Only one physiologic mechanism is disturbed, this being the patient's ability to carry out the mechanical portion of respiration. If adequate oxygenation and removal of carbon dioxide are maintained, most of the problems of pulse rate, blood pressure, reflexes, cardiac arrest and respiratory complications are nonexistent. This technic of anesthesia is suitable for all age groups. It eliminates all danger of obstruction of the airway, of vomiting and aspiration of vomitus, which is common when a painful intracranial procedure is carried out utilizing very light anesthesia without intubation. Since an endotracheal tube is in place, the patient's head can be placed according to the needs of the surgeon. The concentration of nitrous oxide administered may alter spontaneous rhythms of the cerebral cortex, however, it does not depress the electrical discharges from an epileptogenic focus. This method leaves the cortex in a suitable condition for stimulation as well as for the cortical recording. An additional advantage is the elimination of the danger of the patient having a major convulsion during the operation when local anesthesia is used. As mentioned by the author, the ability to converse with the patient and to reproduce sensory experiences or aura is lost with any technic employing general anesthesia.

Although I have had limited experience with cortical excision for the control of seizures, I have become impressed with similar technics of anesthesia employing controlled apnea and the use of a positive-negative phase ventilator during craniotomy for extremely vascular tumors, and especially for the surgical correction of arteriovenous fistula. It is my belief that anesthesia technics employing controlled apnea have wide application in the field of neurologic surgery.

The Injured or Abnormal Thumb:

Recommendations for Treatment*

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Though only the experienced surgeon will probably undertake reconstructive operations on the thumb, conditions of emergency will force others to treat the acutely injured person. The physician treating the injured thumb under such circumstances should take into consideration certain basic rules as laid down in this paper.

SINCE THE THUMB functionally constitutes 40% of the hand, its preservation, reconstruction, or replacement is of major concern if injury, disease, or deformity compromises normal usefulness. Ideally, prehension, motion, durability, stability, and sensation are preserved or restored by adequate primary care of the injured thumb and local reconstruction of the diseased or abnormal thumb. However, it may be possible to supply only the basic ability to contact the fingers in opposition. When the thumb is absent or lost, surgical replacement should be considered.

Abnormal Conditions of the Thumb

1. *Loss or deformity of soft tissue.* In discussing *loss of skin or any abnormality of the soft tissues,* lacerations should be considered first. Also, one must remember that the laceration may be created by the surgeon's knife. Incisions always should be transverse, following the lines of the skin, or should be on the lateral borders and never across creases. The direction of a laceration should be changed, if necessary, to place the scar in one of these locations. Wounds always should be closed. When loss of skin occurs, the resulting wound should be covered with a skin graft as little extra skin exists. The superficial loss of skin may be replaced easily and successfully by applying a thick split skin graft. At times a full thickness graft may give a more ideal result; but, routinely, it is not as successful. If loss of skin and soft tissue exposes tendon or bone, or if the area requires additional surgical treatment, replacement by a pedicle skin graft, rather than a split skin graft, is indicated. To have skin with normal sensation over the tactile surface of the thumb is important.

A skin graft should be placed on normal tissue. Because *granulation tissue heals as scar, then contracts and becomes avascular,* it should be excised whenever possible before a graft is applied. Scars around the thumb may bind it into a fixed adducted position. If the scarring is superficial, as after a burn in which granulation tissue has been allowed to remain and contract, excising the scarred skin and contracted tissue down to normal subcutaneous fat and then covering it with split skin will allow adequate mobility (Fig. 1). If the cicatrix is deep, associated with contracture of muscle, fascia, or capsule, the excision must include all of the structures and may necessitate release of the adductor and the first dorsal interosseus muscles to allow the thumb to move away from the hand. Skin replacement by a pedicle graft then will be necessary, if a local shift of tissue by Z-plasty does not provide sufficient soft tissue for a covering.

Laceration of the *digital nerve* demands repair, and fortunately good results can be obtained. Nerve grafting should be attempted if there is loss of substance. Sensation in the thumb is necessary to preserve sterognosis and to prevent trophic ulceration.

Damage by laceration, infection, attrition and spontaneous rupture, or paralysis may occur in the *tendons* of the flexor pollicis longus, extensor pollicis longus, extensor pollicis brevis, and the abductor pollicis longus. Treatment may be by suture, tendon graft, or by tendon transfer. With mobile joints and adequate covering of soft tissue, tendon re-

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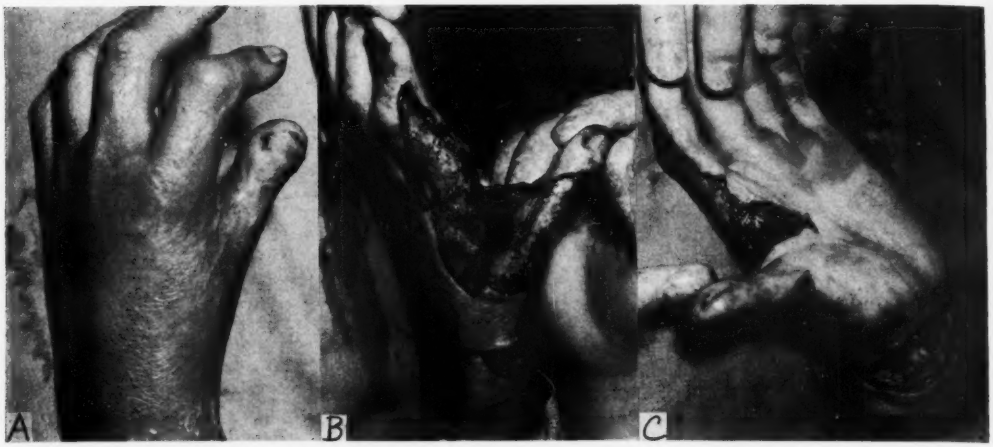
FIG. 1, A-C



(A) Cicatrix with contracture of soft tissue secondary to burn binding the thumb into adduction. (B and C) The scarred skin has been excised. (Courtesy of A.M.A. Scientific Exhibits, 1957, Pollicization of the Index Finger, New York, Grune & Stratton, pp. 280-286.)

FIG. 1, D-E

Photographs demonstrating the functional result following release of soft tissue and skin grafting. (Courtesy of A.M.A. Scientific Exhibits, 1957, Pollicization of the Index Finger, New York, Grune & Stratton, pp. 280-286.)

pair and replacement usually is more satisfactory in the thumb than in the fingers, for in the thumb an incomplete range of motion is functional as long as the fingers can be contacted.

2. *Loss or deformity of the bone or joint.* A *fracture or dislocation* of the thumb demands meticulous treatment for optimum results. Although a fracture of the shaft only requires correction of length and alignment by cast-fixation with or without traction, a fracture-dislocation, or a fracture in which fragments are displaced from the joint surface must be replaced accurately. Bennett's fracture-dislocation of the carpometacarpal joint is the classic example of this type of injury (Fig. 2). This fracture demands accurate replacement of the fragment, and is treated best by open reduction and internal fixation with small threaded wires.[1] This technic allows rapid resumption of activity and assures anatomic reduction. Skeletal traction and blind pinning are satisfactory procedures if adequate reduction is secured. Marginal fractures associated with partial dislocation also occur in the distal joints of the thumb (Fig. 3). Cast-fixation and continuous skeletal traction may be used; however, reduction will fail if the fragment is impacted in malposition or if a tendon inserts on the fragment. These fractures then should be reduced openly and immobilized by threaded wires. An old fracture-

FIG. 2

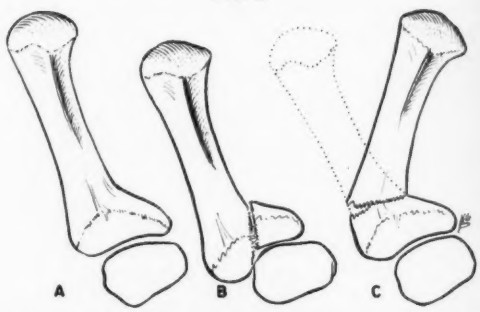


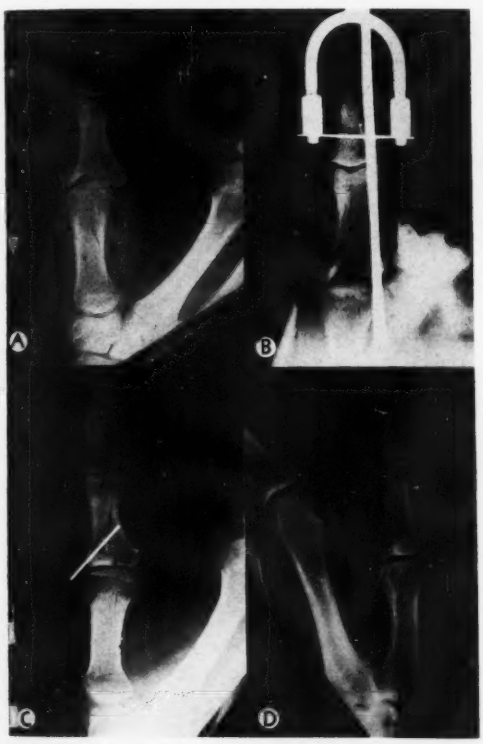
Diagram illustrating: (A) Normal carpometacarpal joint of the thumb. (B) Bennett's fracture dislocation. (C) Fracture of the shaft of the metacarpal of the thumb. (From South. M. J. 42:931, 1949.)

dislocation occasionally may be treated by open reduction; but, usually, it is associated with traumatic arthritis which requires arthrodesis of the joint for relief of pain. This is especially true of the Bennett's fracture which has been treated inadequately.

Most dislocations can be reduced by closed manipulation; however, if an interposed tendon or capsule prevents reduction, open reduction should be performed. Adequate immobilization of an acute sprain or dislocation with tearing of the capsule and ligaments will prevent later instability and arthritic change.

An *unstable or arthritic joint* in the thumb usually is best treated by arthrodesis of the involved joint. Some loss of motion will not interfere greatly with function if pain is eliminated, stability is restored, and the thumb is positioned so that it may be contacted by the fingers.

FIG. 3



(A) Roentgenographic view of a compound comminuted fracture dislocation of metacarpophalangeal joint. (B) An attempt to reduce the fracture by traction failed because the short extensor tendon inserted upon the rotated fragment. (C) Roentgenogram following open reduction with internal fixation. (D) Roentgenograms one year following injury. Function was normal. (Courtesy of A.M.A. Scientific Exhibits, 1957, Pollicization of the Index Finger, New York, Grune & Stratton, pp. 280-286.)

Therapy for the *ununited fracture* of the thumb should include intramedullary grafting of cancellous bone and internal fixation with fine threaded wires.

A *malunited fracture* interfering with function should be corrected by osteotomy and the position should be maintained by wire fixation.

3. *Paralysis.* Interruption of any of the three major nerves of the arm interferes with function of the thumb. The ideal treatment is to repair the nerve; however, if function does not return, tendon transfers are indicated. Injury to the radial nerve causes paralysis of the long and short extensor and the long abductors muscles. Damage to the ulnar nerve paralyzes the adductor and a portion of the short flexor muscles, while injury of the median nerve paralyzes the opponens, the abductor brevis, and the remaining short flexor muscles. Local wounds of the hand may destroy the small branch from the median nerve to the opponens muscle. The location of this nerve should be known and safe-guarded by any physician who attempts surgical treatment of the hand. If it has been lacerated, repair may restore function to the paralyzed muscle. Various types of tendon transfers have been recommended for restoring function after damage to the thenar muscles—the most important and the most frequently used are those procedures to restore opposition. Reconstructive tendon transfers have been extensively and adequately described by Bunnell,[2] and these technics should be consulted and followed by one inexperienced in the use of tendon transfers. If loss of power around the thumb is extensive or if muscles are insufficient to act as tendon motors, an arthrodesis or bone block between the index metacarpal and the thumb, with the thumb placed in the position of opposition, occasionally is the best compromise to restore function.

4. *Partial or complete amputation.* Surgical amputation of the thumb should be considered only for gangrene or malignant lesions. Otherwise, reconstructive procedures always are indicated rather than the surgical removal of any portion of the thumb. A partial amputation never should be completed unless cir-

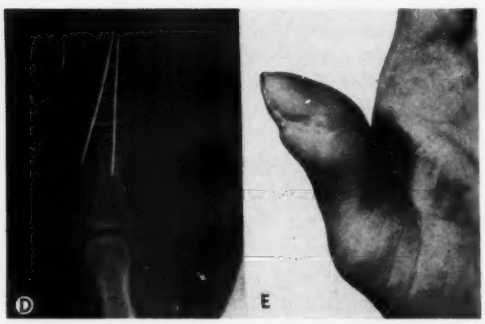
FIG. 4, A-C

(A) Photograph showing incomplete amputation of the thumb. Only one digital vessel remains. (B) Roentgenographic view. (C) The injured thumb after debridement, suture, and internal fixation. (Courtesy of A.M.A. Scientific Exhibits, 1957, Pollicization of the Index Finger, New York, Grune & Stratton, pp. 280-286.)

culation in the remaining soft tissue connection is insufficient to support the thumb if it is restored. Preservation of only one digital vessel may allow survival of the thumb (Fig. 4). An amputated tip may be replaced with uncertain success. When attempted, fat should be removed so it is almost a full thickness skin graft. If an amputated thumb is brought in with the patient, repair may be attempted by removal of the skin from the severed thumb, replacement of the bone on the end of the stump, and the immediate application of an abdominal pedicle graft to the denuded area.[3,4]

When a portion of the thumb has been amputated, all efforts should be made to preserve length by grafting skin, shifting of a local pedicle graft, or by replacement by an abdominal pedicle graft. When amputation results in a short thumb, length may be increased relatively by phalangization or deepening of the web. This may be done by Z-plasty and by release of the adductor and the first dorsal interosseus muscles. The actual length of a short stump also may be increased by a pedicle skin graft to increase the soft tissue length and a bone graft for stabilization. If possible, normal skin should be placed over the tactile surface of the thumb when this procedure is undertaken, since the absence of normal sensation may lead to ulceration of the distal end of the pedicle, and such ulcers are very difficult or impossible to heal.

FIG. 4, D-E



(D) The postoperative roentgenogram. (E) Late functional result. (Courtesy of A.M.A. Scientific Exhibits, 1957, Pollicization of the Index Finger, New York, Grune & Stratton, pp. 280-286.)

Replacement of a thumb that has been lost entirely has interested many surgeons concerned with the abnormal hand,[5-7] and ingenious surgical procedures to accomplish its restoration have resulted. The decision to replace the thumb must be made after all factors have been considered. The elderly patient or one who has adjusted to loss of his thumb over a long period of time usually is not a good candidate. The exact procedure utilized will vary with the surgeon's experience and the individual abnormality of the hand.

Procedures for Replacing the Thumb

1. *Tubed abdominal pedicle with bone graft implant.* This technic requires multiple

procedures and creates an immovable, insensitive post with an abnormal appearance. Lack of sensation leads to trophic ulceration which may be difficult or impossible to heal.

2. *Toe to hand transfer.*[8,9] This complicated procedure requires a prolonged uncomfortable position. Cosmetically, it is undesirable. Even if tendons and nerves are repaired, normal motion and sensation are lacking. The great or second toe which are the most important to weight-bearing are sacrificed.

3. *Transfer of a digit from the other hand.* Why complicate the problem by tying up both hands for weeks and making them both abnormal?

4. *Transfer of a digit, other than the index finger, from the same hand.* This procedure must be performed by the neurovascular-bundle technic and is complex; however, transfer of the little finger should be considered at times as it can be sacrificed with the least loss of function.

5. *Transfer of the index finger or a portion thereof.* This usually is the simplest procedure for pollicization. Ideally, an abnormal index finger is utilized; however, transposition of the normal digit is also recommended

FIG. 5

(A) Traumatic amputation of the thumb. (B) Roentgenogram demonstrating the extent of loss of the thumb. (C) Photograph following repair with split skin graft. (D) Postoperative roentgenogram following pollicization. (E and F) Photographs demonstrating the functional result. (Courtesy of A.M.A. Scientific Exhibits, 1957, Pollicization of the Index Finger, New York, Grune & Stratton, pp. 280-286.)

(Fig. 5). Although the appearance is abnormal, the cosmetic result is better than with the other procedures. If the nerve supply is maintained and the tendons are preserved or transferred, the functional result is excellent.

The basic procedure consists of mobilization of the index finger by incision between the index and the long finger. This necessitates ligation of the digital vessels to the radial side of the long finger to preserve the normal blood supply of the index finger. The digital nerves can be separated well into the hand and must be preserved for optimum function. The second dorsal interosseus muscle is separated from the metacarpal of the index finger and allowed to remain with the middle ray. The junctura tendinum between the extensor tendons are severed. The remaining structures, except for the adductor of the thumb which originates from the third metacarpal, separate with their respective metacarpals. This adductor may be freed from the third metacarpal. The index finger then is completely mobilized when the base of the index metacarpal is severed. After shortening the metacarpal as much as desired, the finger then may be rotated into the position of the thumb and the osteotomy site secured by wires; or, if a portion of the metacarpal of the thumb remains, the metacarpal of the index finger may be moved and attached to this remaining portion to secure union. The more the index ray is shortened, the better the cosmetic result will be; however, when the ray is shortened too much, tendon shortening must be accomplished and the procedure becomes more complicated. The area of skin loss in the new thumb web then may be covered by previously planned local pedicles plus split skin grafts, or by an abdominal pedicle skin graft.

Transfer of the index finger by the neurovascular-bundle technic has been performed.[10-12] Cosmetically, the result of this operation is more satisfactory because the length of the thumb is more normal; however, for the surgeon who performs pollicization procedures infrequently, probably transfer of the entire ray is safer and easier.

Summary

Functionally, the thumb is a major portion of the hand. Because all physicians at times must care for injuries of this important digit, they should be familiar with the possibilities for repair. In treating acute injuries, reconstruction of the thumb should be as complete as possible, or all viable portions of the thumb should be saved by covering the wounds with skin so that subsequent surgical treatment may restore maximum function of the hand.

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Diagnosis and Treatment of Congenital Vascular Anomalies Causing Bronchial Asthma*

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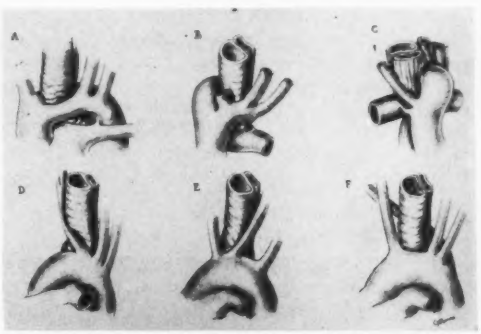
Angiocardiography has offered a means of visualizing intrathoracic anomalies of the great vessels which may masquerade as bronchial asthma. The suspicion of such abnormalities should arise particularly if the "asthma" has dated since birth.

MANY CONDITIONS RESEMBLE the wheezing of bronchial asthma. Most of these are easily differentiated by the ordinary methods of diagnosis. The recognition of the conditions which simulate asthma have been classified by some[1,2] as nonallergic asthma. We are concerned primarily with the cardiovascular anomalies which cause wheezing and are treated as bronchial asthma.

One of us has previously demonstrated[3] that this wheezing can result from the congenital maldevelopment of the major vascular structures of the thorax so they constrict, displace, or produce pressure on the trachea, esophagus, or both. You are aware of those conditions called vascular rings, such as a double aortic arch, which cause symptoms easily recognized and surgically corrected[4] (Fig. 1). In this report we will demonstrate anomalies of the great vessels, primarily those of the innominate artery,[5] causing serious incapacity. These are also easily diagnosed but are treated by many of us as bronchial asthma.

FIG. 1



Anomalous vascular rings. (A) Double aortic arch. (B) Double aortic arch. (C) Right aortic arch with ligamentum arteriosum. (D) Anomalous innominate artery. (E) Anomalous left carotid artery. (F) Abberrant right subclavian artery.

Material

Ten cases (Table 1) of 5 boys and 5 girls, varying in age from 3 months to 8 years, were followed from September, 1955. Seven had a history of having wheezed since birth and 3 of the children had difficulty in breathing in the first 6 months of life. All of the patients had difficulty in breathing, croupy cough, and nasal discharge. Four of the children had difficulty in swallowing. In each case, the acute episodes occurred in the late fall and winter months, usually following a cold or an acute upper respiratory infection. In 8 of the cases the patients were proven to have typical allergic rhinitis, starting with the allergic salute, in the first few days of life, as the earliest sign.

TABLE 1

SEX, AGE AND SYMPTOMS
10 Patients with Intrathoracic Anomalies of the Great Vessels

Sex	5 male, 5 female
Age	6 under 1 yr., 4 over 1 yr.
First symptoms	7 at birth, 3 during 1st yr.
Difficulty in breathing	10
Difficulty in eating	4
Associated allergic rhinitis	8

*Read before the Section on Allergy, Southern Medical Association, Fifty-Second Annual Meeting, New Orleans, La., November 3-6, 1958.

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Procedure

A complete history, physical examination, allergy examination, including nasal smears for eosinophils, and roentgenograms were done. Esophagrams and bronchograms were done in some cases. After consultation with an otolaryngologist, 4 children had their tonsils and adenoids removed in an attempt to prevent recurrent upper respiratory infections. A trial period of hyposensitization, together with the symptomatic use of such drugs as expectorants, bronchodilators, and the aerosolization of antibiotics containing mucolytics, such as Alevaire, was carried out.

If this trial did not prove efficacious, bronchoscopy and angiocardiography was performed.[6,7]

Case Reports

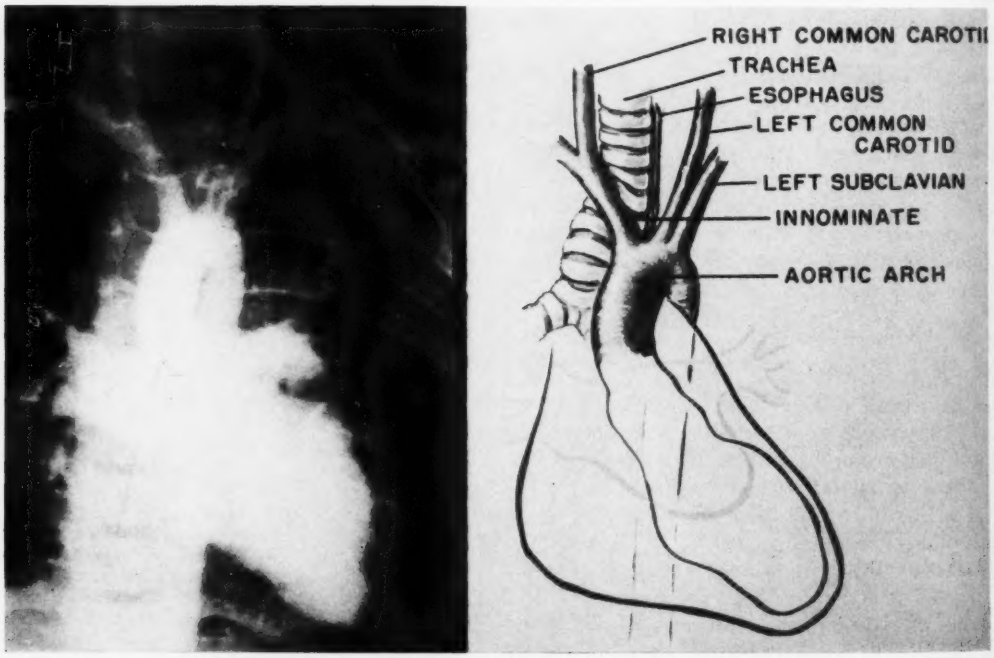
Case 1. A 9 month old boy was seen for the first time on Nov. 21, 1956, with wheezing respirations, profuse nasal discharge, rubbing of the nose, and a history of frequent upper respiratory infections (Fig. 2). Fever was variable. The symptoms had started at birth and had become progressively worse with each episode. The infant was unable to take food well and refused solids.

Allergy skin tests were done and the child was found to be mildly reactive to inhalants and pollens. Hyposensitization therapy was given together with symptomatic drugs, such as antihistamines, bronchodilators, and expectorants. After no apparent improvement in 3 months, a study with a barium swallow was done and reported as negative.

On Aug. 29, 1957, 8 months after the child was first seen, bronchoscopy and angiocardiography was done. The bronchoscopy revealed the tracheal mucosa to be normal, but the carina was blunted and an indentation of the distal portion of the trachea was visualized. The left main stem bronchus was definitely narrowed. These indentations could be opened easily with slight pressure of the bronchoscope. A moderate amount of thick mucopurulent exudate was present throughout the tracheobronchial tree. Following bronchoscopy, a "cut-down" was performed in the right antecubital fossa exposing the right antecubital vein. A large trochar was tied in place in the vein and the angiocardiogram was done with the injection of 15 cc. of radiopaque media (Urokon). The films were viewed and the trochar was withdrawn. The vein was ligated and the incision closed. The angiocardiogram revealed the ascending segment of the aorta to be slightly to the left of the midline of the body and the innominate artery was found to cross the trachea at the level of the thoracic inlet, causing compression of the trachea and esophagus.

On Sept. 16, 1957, at the age of 20 months, the child was taken to surgery and complete freeing of the

FIG. 2



Angiocardiogram and drawing showing the innominate artery arising from the left of the arch of the aorta and crossing the trachea obliquely, causing compression of both the trachea and the esophagus.

aortic arch and its major branches was performed, pressing them forward into the proximity of the sternum.[8] Sutures were placed in the anterior surface of the innominate artery and the arch of the aorta and attached to the periosteum of the under surface of the sternum.

There was complete relief of the symptoms immediately postoperatively. Subsequent follow-up studies showed the child to have mild allergic rhinitis which was treated symptomatically with antihistamines. A severe upper respiratory infection in July, 1958, was not accompanied by stridor, wheezing, or feeding difficulties.

Case 2. A four year old girl was first seen on Dec. 17, 1954, with harsh wheezing respirations. Nasal drainage and rubbing of the nose were present. There was a history of frequent sore throats and upper respiratory infections, with fever varying from 100 to 104° F. The symptoms had started at 6 months of age.

Allergy examination and pulmonary function studies were done. She was found to be sensitive to inhalants, pollens, and molds. The vital capacity, maximum breathing capacity, and walking ventilation were considerably reduced. She was classified as having bronchial asthma and pulmonary emphysema.

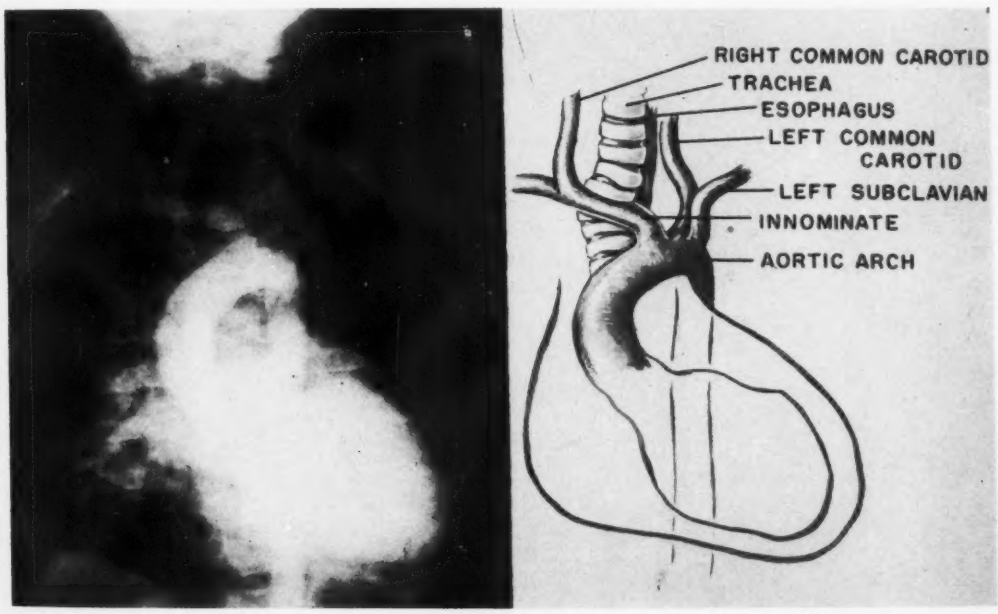
Hyposensitization therapy together with symptomatic medications gave marked improvement. During the warm summer months she had no acute episodes of wheezing, but she was dyspneic on exertion and had a croupy expiratory cough. During the winter months each upper respiratory infection caused fever, acute severe wheezing, and cough resulting in dyspnea, cyanosis, and need for oxygen and hospitalization. An examination by barium swallow was done on Oct. 20, 1957, and found to be negative.

Pulmonary function studies showed further impairment, especially in walking ventilation using a ventube. On Oct. 23, 1957, approximately 3 years after the date the child was first seen, angiocardiography was performed. This was six and a half years after the onset of her first symptoms. Angiogram revealed the arch of the aorta to be slightly to the left of the midline of the body, the innominate artery coming off to the left of the midline crossing the trachea and causing partial tracheal compression. On Nov. 7, 1957, at the age of 7 years 9 months, the child was operated upon. At operation, it was very easy to demonstrate the innominate artery crossing obliquely over the trachea and causing compression. The arch of the aorta and the innominate artery were freed and pressed forward into the proximity of the sternum. These structures were then approximated to the periosteum of the under surface of the sternum by sutures.

Marked improvement in breathing resulted, following a stormy postoperative course. The child did very well without treatment for 3 months. In July, 1958, following a high pollen count, she developed mild wheezing with no dyspnea or cyanosis. Aerosol bronchodilators were given by intermittent positive pressure breathing using the Ventalung. Hyposensitization treatments were continued as well as supportive therapy. Respiratory exercises[9] and intermittent positive pressure breathing[10] have decreased the emphysema. Subsequent upper respiratory infections have caused symptoms which are easily controlled.

Case 3. A 10 month old girl was first seen on Sept.

FIG. 3



Anigocardiogram and drawing showing the innominate artery arising from the left of the arch of the aorta and crossing the trachea at right angles, causing compression of the trachea and esophagus.

21, 1955, with difficulty in breathing, wheezing respirations, cough, constant nasal drainage, and rubbing of the nose. There was a history of frequent upper respiratory infections resulting in fever, marked stridor, dyspnea, and cyanosis. These symptoms had their onset at birth.

Allergy examination was done, and the infant was found to have mild skin reactions. Hyposensitization treatments, together with bronchodilators and expectorants, were given. In spite of this treatment each upper respiratory infection resulted in marked dyspnea and cyanosis, requiring oxygen and aerosolized bronchodilators. Study by barium swallow and bronchogram was done after the child had been hospitalized on two occasions for this condition. Atelectasis had been found on both occasions in the right upper lobe. The results of the barium swallow and bronchogram were considered normal. At this time bronchoscopy and angiocardiography were recommended and refused. These were advised because a congenital vascular anomaly was suspected.

On Oct. 24, 1957, approximately 2 years after the child was first seen, bronchoscopy and angiocardiography were done. The bronchoscopy revealed narrowing of the anteroposterior diameter of the trachea with some narrowing of both the main stem bronchi. The angiocardiogram revealed the innominate artery to arise to the left of the midline, crossing the trachea at right angles and causing partial tracheal obstruction. Operation was done on Dec. 5, 1957, when the child was 2 years of age. The left main stem bronchus was dissected free but apparently did not open to its normal circumference. It is felt that the left main bronchus was definitely hypoplastic. The innominate artery and the arch of the aorta were freed and lifted, and the adventitia was sutured to the periosteum of the under surface of the sternum.

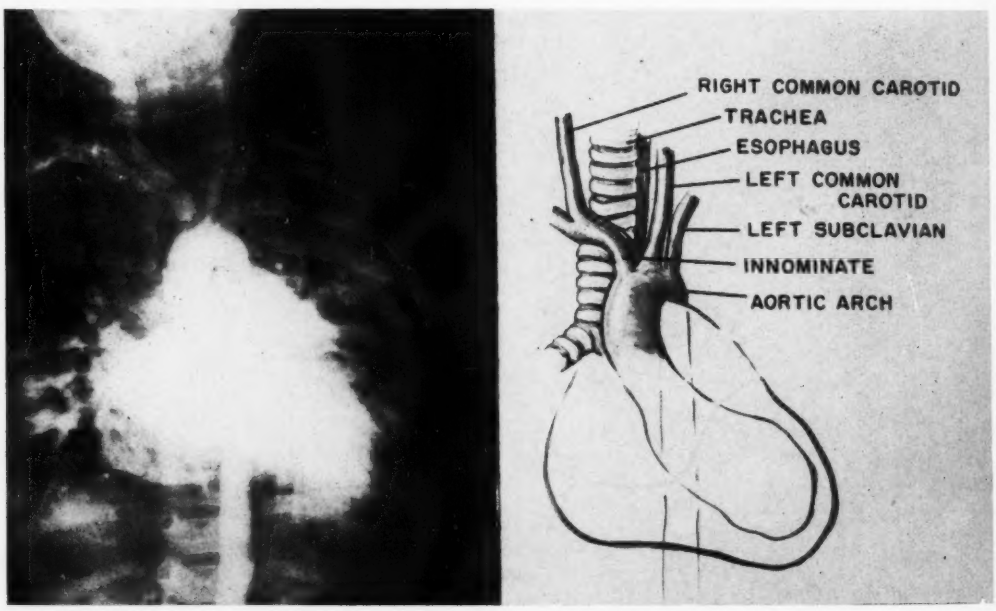
The child has improved, having no more severe episodes of difficult breathing. There is still a constant wheeze, especially on exertion. She is receiving hyposensitization therapy and does fairly well.

Case 4. A 13 month old boy was first seen on Nov. 6, 1957, with wheezing, croupy cough, productive of purulent sputum (Fig. 3). Symptoms had started at birth, which included vomiting of milk and refusal of solid foods, together with frequent upper respiratory infections. The infant was a dependent of an Army person, and had been in several Army General Hospitals with pneumonia.

On examination of the chest there were wheezing and harsh breath sounds but no change in percussion. There was a slight anemia. No allergy tests were done.

On Dec. 12, 1957, one month after the child was first seen, bronchoscopy and angiocardiography were performed. Bronchoscopy showed that the proximal end of the left main stem bronchus and the distal end of the trachea were considerably reduced in size from extrinsic pressure. Hypertrophic endobronchitis was present throughout the left side of the tracheobronchial tree. A considerable amount of thick, purulent exudate was aspirated. The angiocardiogram showed the innominate artery arising to the left of the midline and crossing the trachea at right angles causing considerable compression of both the trachea and the esophagus. On Dec. 15, 1957, at the age of fourteen months, operation was done. The innominate artery

FIG. 4



Angiocardiogram and drawing showing the innominate artery arising from the left of the arch of the aorta and crossing the trachea obliquely, causing compression of the trachea and esophagus.

and the arch of the aorta were raised. The left main stem bronchus was freed of the surrounding structures. The adventitia of the innominate artery and the aortic arch were sutured to the under surface of the sternum. The child became completely asymptomatic, no allergy management was necessary and the child has remained well to this time.

Case 5. A 7 month old girl was first seen on Sept. 3, 1957, with what had been diagnosed by the child's pediatrician as bronchial asthma (Fig. 4). The symptoms which had started at birth, included spitting up of all food except milk. The infant had a nasal discharge and typical atopic dermatitis. A history of frequent colds and no gain in weight were recorded.

Allergy examination was done and the child was found to be reactive to inhalants, pollens, and foods. Foods were eliminated and Mullsoy was started. Antihistamines and bronchodilators were tried without improvement. A trial of hyposensitization was begun with marked improvement in the skin and vomiting. At the time of the next upper respiratory infection, marked wheezing, dyspnea, and cyanosis resulted. On Dec. 14, 1957, 3 months after the infant was first seen, bronchoscopy and angiocardiography were done. Bronchoscopy showed narrowing of the distal end of the trachea and narrowing of the left main stem bronchus. The angiocardiogram showed the innominate artery to rise to the left of the midline, crossing the trachea obliquely and causing compression of the trachea and esophagus. On Jan. 2, 1958, at the age of 10 months, an operation was done. The left main stem bronchus was freed of the surrounding structures. The adventitia of the innominate artery and aortic arch was sutured to the periosteum of the under surface of the sternum.

The child has been completely free of symptoms except for allergic rhinitis. There has been no asthma or vomiting.

Case 6. A 4 year old boy was first seen by us on Oct. 3, 1955. His symptoms had started at birth and had become progressively worse, resulting in pulmonary emphysema. There was a history of upper respiratory infection, resulting in two episodes of pneumonia requiring hospitalization.

Allergy examination revealed reactions to house dust, ragweeds, grasses, mesquite, and mountain cedar. A trial period of hyposensitization was given, together with expectorants and bronchodilators. Aerosol treatments using penicillin, bronchodilators (Isuprel) and mucolytics (Alevaire) gave gradual improvement. There was still considerable dyspnea, especially on exertion.

An esophagram was done and found to be negative. Cardiac consultation reported no congenital heart disease, and cardiac catheterization was not done.

On June 10, 1958, 2 years and 3 months after the child was first seen, bronchoscopy and angiocardiography were done. No abnormality was found on bronchoscopy. The angiocardiogram revealed an anomalous innominate artery.

He was operated upon on Jan. 10, 1958, when 6 years 3 months of age. The innominate artery and the arch of the aorta were freed and sutured to the periosteum of the under surface of the sternum. He was prepared for operation by using oral steroids (Aristocort) and was completely free of symptoms. Symptomatic treatment has been continued since operation. Acute upper respiratory infection still causes wheezing but no marked dyspnea and cyanosis. He has gained weight and was rehabilitated.

Case 7. A 6 month old boy was first seen by us on Dec. 6, 1957, with stridor, wheezing respirations, croupy cough, marked nasal drainage, and inability to take solid foods. The mother had been told by the pediatrician that the child had allergy and bronchial asthma.

Allergy skin tests were done and after a trial period of hyposensitization, bronchoscopy and angiocardiography were carried out on Jan. 16, 1958, one month after the infant was first seen. Bronchoscopy revealed narrowing of the distal end of the trachea and the left main stem bronchus. Angiocardiogram showed an aberrant innominate artery coming from the left of the midline and crossing the trachea causing compression of the trachea and esophagus.

He was operated upon on Jan. 17, 1958, at 7 months of age. The left main stem bronchus was freed from several peribronchial bands of fibrous tissue. The innominate artery and the aortic arch were dissected free and the adventitia of both was sutured to the periosteum of the under surface of the sternum. This child has been completely free of symptoms except for mild allergic rhinitis.

Case 8. A 4 month old boy was first seen by us on Jan. 29, 1958. Symptoms had begun at the age of 3 months. There had been severe wheezing, croupy cough, and upper respiratory infections followed by pneumonitis. Study by a barium swallow was negative. Allergy skin tests were not done and the child was treated symptomatically with antibiotics, expectorants, and bronchodilators. There was very little improvement.

On Feb. 13, 1958, 3 weeks after the infant was first seen, bronchoscopy and angiocardiography were done. Bronchoscopy revealed narrowing of the left main stem bronchus. The angiocardiogram revealed the innominate artery arising to the left of the midline going around the trachea and causing compression of the trachea.

On Feb. 25, 1958, when the child was 5 months of age, operation showed the innominate artery crossing obliquely over the trachea and causing the compression. The innominate artery and arch of the aorta were freed and passed forward into the proximity of the sternum and sutured to the periosteum of the under surface of the sternum. The infant has remained completely asymptomatic, requiring no further treatment.

Case 9. A 3½ year old girl was first seen by us on Feb. 15, 1957. The symptoms first started at birth. She had a croupy cough, wheezing, and periodic severe dyspnea causing cyanosis. There was a history of frequent upper respiratory infection.

Allergy examinations showed the patient to be sensitive to house dust, wool, feathers, milk, citrus, ragweeds, careless weeds, mesquite, and mountain cedar. Thirteen months of hyposensitization was carried out, in addition to using expectorants, bronchodilators, and aerosols.

Because the child had a bad winter with the above

symptoms, bronchoscopy and angiocardiography were done on Apr. 2, 1958, 13 months after she was first seen. The bronchoscopy showed a slight diminution of the size of the anteroposterior diameter of the distal trachea. There was a decrease in the size of the orifice leading to the right middle lobe. The angiocardiogram showed a levo-position of the aorta and an anomalous innominate artery causing compression of the trachea. On Apr. 7, 1958, when the child was 4 years and 7 months of age, she was operated upon. A complete thymectomy was done, the aorta and its branches were dissected free, and the innominate artery and aortic arch were sutured to the periosteum on the posterior surface of the sternum. Moderate improvement has resulted. The child is now receiving hyposensitization therapy. With each upper respiratory infection there is now only mild wheezing.

Case 10. A 7 year old girl was first seen by us on Jan. 13, 1957. There was a history of having a croupy cough, wheezing respirations, and marked dyspnea following each upper respiratory infection. This had occurred every year in the winter, since she was 3 months of age. When first seen, she had marked dyspnea and nasal drainage. She was treated with steam inhalations, aerosols, and bronchodilators.

After the acute symptoms subsided, bronchoscopy and angiocardiography were done. Compression of the trachea and narrowing of the left main stem bronchus were evident. The angiocardiogram showed the innominate artery and the aorta in levo-position, the innominate artery causing partial tracheal compression. Allergy skin tests were performed on Jan. 14, 1957, and the child was found to be sensitive to house dust, feathers, wool, eggs, shellfish, mesquite, and mountain cedar.

Operation was recommended and refused. The patient was discharged from the hospital and did not return for recommended treatment.

Following this period of hospitalization, the patient developed varicella and had severe cough, dyspnea, and wheezing in Feb., 1958. In Mar., 1958, she developed measles with the usual upper respiratory component and has severe asthma, dyspnea, and cyanosis. Symptomatic therapy has been continued. During the warm months the child remains symptom-free until the first north winds bring in the fall pollens (ragweeds, scrub elm) and molds, causing rhinitis, croupy cough, and wheezing. A trial of hyposensitization, antihistamines, and bronchodilators was made. There was some improvement, but she developed influenza with high fever. The child has been seen at periodic intervals with a history of typical acute respiratory infection causing severe symptoms. To date no surgical treatment has been done.

Results

Ten cases of suspected intrathoracic anomalies of the great vessels have been presented (Table 2). All patients had chest x-ray studies which revealed no abnormalities except atelectasis in one case. In four cases esophagrams gave no indication of the type or degree of deformity present. In three cases bronchograms did not add to the diagnosis. Four children had had tonsillectomy and adenoidectomy in an attempt to relieve their symptoms. Bronchoscopy done in nine cases revealed some evidence of narrowing of the trachea and left main stem bronchus by compression. Angiocardiography in ten cases resulted in no complications and gave the exact information as to the possible cause for the symptoms. Nine patients were subjected to operation without complications.[8] Five of these have recovered completely requiring no further treatment. Three of the children in the older age group (7 years 9 months, 6 years 3 months, and 4 years 7 months) were moderately improved. They required hyposensitization and symptomatic drugs, and had no severe episodes following surgical treatment.

One patient showed fair improvement, required hyposensitization treatment, had constant wheezing, but had no acute severe dyspneic or cyanotic episodes as in the past. One child, not operated upon, had severe episodes following each upper respiratory infection.

Discussion

In the group of congenital anomalies of the aortic arch classified as vascular rings, double aortic arch is the variant that most commonly causes severe symptoms. These symptoms are usually severe enough to lead to bronchoscopy and angiocardiography. The next most common abnormality is an aberrant origin of the innominate artery. When the innominate artery arises farther along the aortic arch to the left, there is compression of the trachea or esophagus in its normal course back to the right side of the chest. The symptoms resulting from this deformity are frequently permitted to go on incorrectly diagnosed as bronchial asthma. Improvement in the symptoms and findings does occur with the usual meth-

TABLE 2

RESULTS OF DIAGNOSTIC PROCEDURES AND OPERATION

Procedure	*Number of Patients*	*Findings*
Esophagrams	4	4 negative
Bronchograms	3	3 negative
Bronchoscopy	9	8 positive
Angiocardiograms	10	9 positive
Surgery	9	5 complete recovery 3 moderate recovery 1 fair recovery

ods of treatment. They return, however, with the onset of the next upper respiratory infection. Most of these cases are allowed to continue in this manner, especially when the deformity does not cause enough esophageal compression to cause dysphagia. When difficulty in swallowing accompanies the severe dyspnea of these conditions, other methods of diagnosis such as bronchoscopy and angiocardiography are usually employed. This series of cases demonstrates that all of the patients had wheezing and dyspnea, but only four had dysphagia.

One should be highly suspicious of the infant who has had a croupy cough since birth, especially one accompanied by a harsh, high pitched wheeze. These findings are in contrast to the musical, sonorous, and sibilant rales usually heard in typical atopic bronchial asthma. Further suspicions should be aroused when, in addition to the above symptoms, the infant is having feeding difficulties. Each upper respiratory infection brings progressively more severe symptoms, resulting in atelectasis, pneumonitis, or pulmonary emphysema. The esophagram, a relatively simple procedure, has been misleading in our experience. If negative, it supposedly indicates that compression of the esophagus is not severe enough to produce a deformity. This finding should not rule out tracheal compression, which is best diagnosed by bronchoscopy, where actual visualization of the trachea and bronchi is accomplished. Angiocardiography can then be done to outline the course of the abnormal vessels.

These children are usually brought to the allergist after they have been treated by others for a period of from 3 to 6 months. If one is not aware of these conditions, the patient is frequently allowed to go on being treated for bronchial asthma, atelectasis, pneumonitis, or pneumonia. We recommend that all patients having a croupy cough, with severe wheezing, dyspnea, and cyanosis, aggravated by each upper respiratory infection, and now being treated as bronchial asthma be re-evaluated. If these symptoms have been present since birth, and no appreciable progress in therapy is being made, bronchoscopy and angiocardiography should be done to rule out the cardiovascular anomalies called vascular rings. If found, these children should come to operation, since this is the recommended treatment.

Summary

Ten cases in which cardiovascular congenital anomalies caused bronchial asthma have been described. The important symptoms and signs have been reported. The diagnostic procedures and the surgical treatment are given in brief. Nine patients were operated upon, 5 receiving complete relief and requiring no further specific or symptomatic management for allergy. In 3 cases the children were given moderate relief; these were in the older age group and required continued care. One child had fair relief with no subsequent acute episodes. One patient, not operated upon, has had no relief, the symptoms being aggravated with each new upper respiratory infection. The recommended diagnostic procedures are bronchoscopy and angiocardiography and the treatment is surgical.

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CASE REPORT

Multi-Osseous Occurrence of Sclerosing Type Osteogenic Sarcoma

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THE OCCURRENCE OF MULTICENTRIC FOCI of sclerosing type of osteogenic sarcoma has been recognized and reported. Lichtenstein[1] and others recognized the multi-osseous appearance of this tumor. Silverman[2] reported a well-authenticated case involving the spine and pelvis. Geschicter and Copeland[3] and Ewing[4] believed the explanation of the multicentric occurrence is due to embryonal cell rests which undergo malignant growth either simultaneously, or that one tumor will appear shortly after the appearance of another. It is not believed that the multi-osseous appearance of such tumors represents metastasis from one bone to another, but rather that the tumors represent distinct neoplasms of identical or similar cytologic appearance occurring in more than one bone at the same time.

The following case is reported as another well-authenticated instance of the multi-osseous occurrence of sclerosing osteogenic sarcoma appearing in the femur and tibia simultaneously.

B. T., a 54 year old negress, was first seen on Feb. 3, 1958, because of pain and swelling of the right thigh. Enlargement of the right lower thigh had been noted 2 years previously. It had slowly increased in size with development of gradually increasing pain, the pain having become more severe in the 30 days prior to admission. She had continued work as a factory helper until one week prior to admission.

Physical examination was negative except for the right lower extremity which was markedly enlarged in a concentric manner (Fig. 1). The right lower thigh measured 60 cm. in circumference as compared to 40 cm. on the left. There was also visible enlargement of the upper third of the right tibia with tenderness to deep pressure over the tibial tubercle.

Laboratory studies revealed a RBC of 4,440,000, Hgb. of 13 Gm., WBC of 5,600, with normal differential count. Serum calcium was 8.7 and the phosphorus 4.4 mg. per 100 cc.; the serum alkaline phosphatase was reported as 13.0 Bodansky units. Urinalysis was negative, as was a chest x-ray. X-ray examination of the right femur and tibia (Figs. 2 and 3) showed a sclerosing type of neoplasm involving the distal one-half of the right femur and the upper one-fourth of the right tibia. The joint surfaces of the knee were

FIG. 1

Photograph showing enlargement of right lower thigh and anterior aspect of upper tibia.

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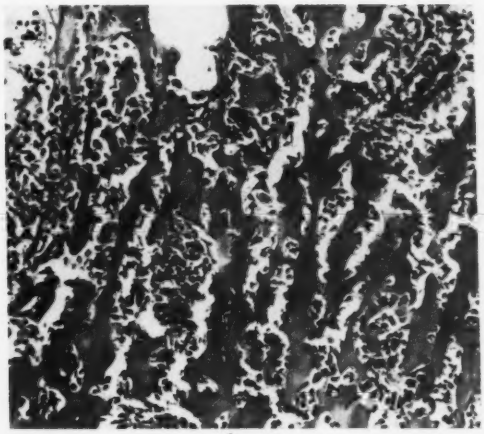
FIG. 2

The right femur and upper tibia show a fusiform sclerotic tumor of femur with irregular neoplastic involvement of upper tibia. Note clearly defined joint space with absence of soft tissue involvement.

FIG. 3

Lateral view of lower femur and upper tibia.

FIG. 4



Photomicrograph showing sarcomatous stroma with bone and osteoid formation with areas of atypical bone formation and anaplastic tumor cells. (X 100).

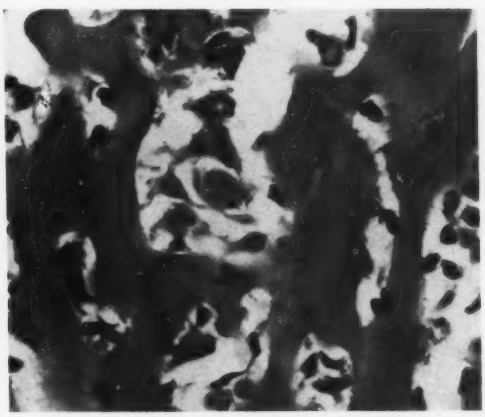
well preserved and there was no x-ray evidence of extension of the tumor across the joint line. A *clinical diagnosis* of osteogenic sarcoma was made.

Biopsy of the tumors of the femur and tibia was done on Feb. 6. The pathologic diagnosis was sclerosing type of osteogenic sarcoma (Figs. 4 and 5).

Following a course of deep x-ray therapy over the tumor sites, disarticulation at the hip was carried out on Feb. 16. The gross specimen was carefully dissected following operation. There was no gross evidence of extension of the tumor into the soft tissues about the knee. Multiple sections of the soft tissues about the knee showed no evidence of tumor cells. The popliteal lymph nodes were negative for tumor cells, but the inguinal lymph nodes did show evidence of metastatic tumor cells.

The patient did well following operation, and in

FIG. 5



Note anaplasia of cells and atypical bone formation. (X 400)

spite of the relatively poor ultimate prognosis she is being considered for a prothesis because of her desire to return to work.

Summary

A case of multi-osseous sclerosing osteogenic sarcoma involving the femur and tibia is reported. Clinical, x-ray and pathologic studies were confirmatory of the tumors arising separately in the tibia and femur and were not instances of metastatic involvement of one bone to another.

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Arthrodesis of the Shoulder in Children Following Infantile Paralysis*

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It is apparent that successful arthrodesis of the shoulder joint is not common. The authors believe their method provides an arthrodesis with useful function.

PARALYSIS OR WEAKNESS OF THE MUSCLES controlling abduction of the shoulder is a common finding following poliomyelitis of the upper extremity. The muscle most often paralyzed is the deltoid. The usefulness of the upper extremity depends, to a large extent, upon the ability to raise the arm from the side of the body. Such common functions as eating, combing one's hair and shaving depend largely on this movement. It is assumed in this discussion that useful function is retained in the elbow joint and in the hand. Without useful function the extremity is flail and useless.

Arthrodesis of the shoulder seems to fix the arm to the scapula in a position which allows the arm to be abducted by the trapezius and the serratus anterior muscles which, fortunately, are seldom paralyzed. Clinical experience teaches us that the shoulder joint is difficult to fuse. Although a number of operations have been devised, not one is universally satisfactory. A frequent cause of failure is due to the loss of contact between the head of the humerus and the glenoid, due to difficulty in maintaining satisfactory immobilization of the shoulder in a plaster cast. Another cause of failure in children is the predominance of cartilage and lack of good, solid bone in the shoulder joint.

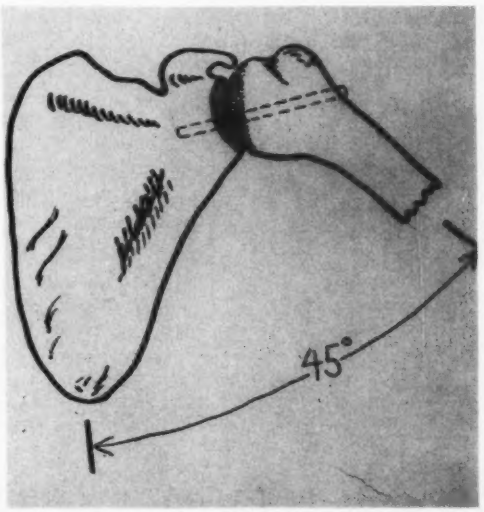
Technic

The operation which we suggest is an intra-articular type (Fig. 1) and is based on the principle of transfixing the humerus to the scapula by means of a bone graft removed from the tibia. The procedure is carried out as follows:

An incision is made beginning two inches above the tip of the acromion process and extending downward along the medial border of the atrophied deltoid muscle to a point about one inch proximal to the deltoid insertion. The flaps are dissected up sufficiently to expose the acromion process and the upper end of the humerus. The fibers of the deltoid muscle are separated by blunt dissection until the capsule of the joint is reached. The capsule is incised longitudinally and reflected from the neck of the humerus exposing the head of the humerus. By rotating the arm, the head of the humerus can be easily forced out of the glenoid.

Next, the cartilage is removed from the head of the humerus and the glenoid fossa, care being taken not to disturb the cartilage

FIG. 1



Intra-articular type of arthrodesis using tibial peg graft.

*Read before the Section on Orthopedic and Traumatic Surgery, Southern Medical Association, Fifty-Second Annual Meeting, New Orleans, La., November 3-6, 1958.

TABLE 1

TABULATION OF OPERATIVE CASES

Patient	Age at Fusion	Length of Follow-up	X-ray Fusion?	Clinical Union	Result
(1) N. H.	5	13	Yes	Yes	Good
(2) J. S.	6	11	Yes	Yes	Good
(3) S. B.	7	12	Yes	Yes	Excellent
(4) J. R.	6	10	Yes	Yes	Excellent
(5) R. N.	8	5	Yes	Yes	Good
(6) C. M.	5	5	No	Yes	Good
(7) D. B.	13	7	?	Yes	Good
(8) W. S.	5	3	Yes	Yes	Good
(9) W. B.	5	5	Yes	Yes	Good
(10) M. C.	15	2	Yes	Yes	Good
(11) E. S.	9	16	Yes	Yes	Good
(12) B. F.	7	11	Yes	Yes	Excellent
(13) C. I.	6	5	Yes	Yes	Excellent
(14) C. V.	7	9	Yes	Yes	Excellent

at the periphery of the epiphyseal plate at the humerus. A bone graft, one-quarter to three-sixteenths inches wide and three to three and one-half inches long, is removed from the anterior face of the upper tibial cortex. The graft is trimmed down and one end is made to a dull point. A drill hole, commensurate with the size of the graft, is placed through the head of the humerus in such a manner that it emerges approximately at the center of the head, thus transversing the central portion of the epiphysis.

The humerus is placed in about 45 to 55° of abduction in relation to the vertebral border of the scapula, in 15 to 25° of forward flexion, and 15 to 25° of internal rotation.

FIG. 2

(Case 11) Preoperative x-ray findings.

The drill is then carried through the predrilled humerus into the glenoid fossa, with the arm steadied in the desired position, for a depth of one to one and a half inches. As the arm is steadied, the drill is withdrawn and the graft is driven in. The incision is closed and a well-fitting spica shoulder cast is applied.

In 1942, the Research Committee of the American Orthopaedic Association conducted a study of the end results on the stabilization of the paralytic shoulder and reported that this position is not the optimum for all cases.[1] In general, the position varies with the age, the sex, and the remaining muscle power. However, with good power in the trapezius and the serratus anterior, the above position is satisfactory.

Results

Excellent Result.

1. The abduction of the humerus to 90°.
2. The ability to place the involved hand to the hair, and to the zipper on the fly of the trousers in the case of a man.
3. Absence of pain.
4. The ability to place the arm to the side of the body without difficulty.

Good Result.

1. The abduction of the humerus to 45°.
2. The ability to place the hand to the mouth and to the zipper on the fly of the trousers in the case of a man.
3. Absence of pain.

FIG. 3

(Case 11) 16 months postoperative.

Poor Result.

1. When abduction is impossible.
2. When the hand cannot be raised to the mouth.
3. Presence of pain.

It will be noted from table 1 that of the 14 children only 2 were older than 10 years of age and 10 were 7 years or younger. Two were between 7 and 10 years of age. Good results were obtained in 9 cases and excellent results in 5 cases. There were no poor results. The longest a case was followed was 16 years and the shortest time was 2 years with an average follow-up of 8 years.

End Results in Two Cases

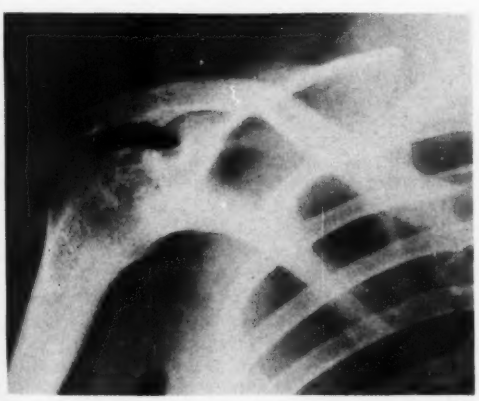
1. Figure 2 represents the preoperative x-ray examination in case 11; and figure 3 represents x-ray film 16 months postoperative. Figure 4 is the last x-ray study taken at 16 years. The patient has 45° of abduction of the shoulder and the fusion was graded as a good result.

2. Figure 5 represents the preoperative x-ray examination in case 13, and figure 6 represents postoperative x-ray study at 4 months, while figure 7 shows fusion at 4 years. The shoulder abducts to 90° and the fusion was graded as an excellent result.

Conclusions

This is not an entirely new procedure. Brett[2] and Levuf[3] have described similar procedures. Brett believed that the procedure should be done after the age of 8 and that one of the indications was tuberculosis. He placed the shoulder in 70° of abduction with 25° of anterior flexion, wiah no mention of the amount of rotation. Besides decorticating the gleno-humeral joint and putting the peg graft across the joint, he produced a green-stick fracture of the acromion process of the scapula and fastened it to the top of the humerus with sutures. He maintained, in the 2 cases he presented, that removal of the distal end of the clavicle would have given a better result since it was prominent following operation. Levuf's procedure was similar in many respects. It differed in that he used a graft, 12 cm. in length, driven through the head of the humerus, which was then passed

FIG. 4

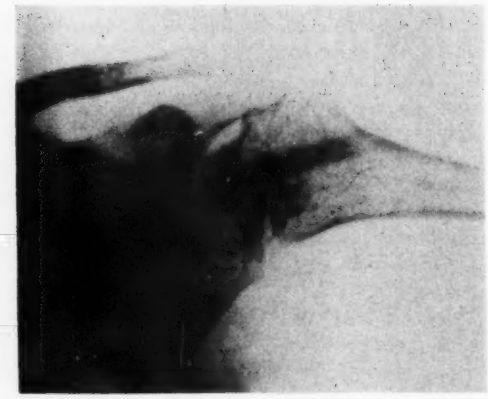


(Case 11) 16 years postoperative.

FIG. 5

(Case 13) Preoperative x-ray examination.

FIG. 6



(Case 13) 4 months postoperative.

anterior to the infraspinatus muscle and, finally, fastened to the inferior border of the spine of the scapula with wire suture. Also, he believed that this procedure could be done for tuberculosis.

Perhaps one of the best known methods of intra-articular arthrodesis of the shoulder is that of Putti.[4] He did not decorticate the glenoid humeral joint. He simply drove a bone peg across the gleno-humeral joint. His method is primarily indicated in cases of tuberculosis where it is not advisable to open the joint.

We believe that our procedure should never be used in tuberculosis of the shoulder.

FIG. 7

(Case 13) 4 years postoperative.

It was designed for use in paralytic affliction and has been used only for this. We believe that the presence of a graft stimulates fusion in addition to stabilizing the shoulder, and that these two factors are responsible for successful arthrodesis in children. We have not found that the graft across the central portion of the epiphysis causes any humeral shortening. We recommend this method of arthrodesis of the shoulder in children.

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Discussion (Abstract)

Dr. Truett James, Dallas, Tex. I should like to thank Drs. Rountree and Rockwood for their excellent presentation and preparation of this very interesting subject.

In preparation for this discussion our interests were stimulated at the Texas Scottish Rite Hospital for Crippled Children, in Dallas, to review our shoulder fusion cases done for paralysis. Our method of grading was slightly different than that of the authors. However, I think much is to be gained from their method of grading, and the emphasis on the ability to place the hand to the zipper of the trousers. This is a very excellent functional method of grading.

At Scottish Rite Hospital we reviewed 21 paralytic shoulders, and it was of considerable interest to find that the average age at time of fusion was 13.9 years. The youngest child fused was 9½ years old and the oldest was fifteen. In contrast to this the authors of the paper given today had a number of children who were fused at 5 years of age, and only 2 of their children were older than 10 years of age when they were fused. We have felt that shoulder fusion in the early age group would be met with considerable difficulty in obtaining bony union, plus the fact that remolding of the epiphysis would occur with loss of scapulohumeral angle. I should like to ask of the authors specifically if they had any cases in which remolding and shifting of the angle occurred as result of changing relationship of the upper humeral epiphysis.

Bone graft was not used in any form in any of the 21 cases treated at Scottish Rite Hospital. Internal fixation with an arthrodesis nail was used in 18 cases. Screw fixation was used in one case and suture fixation in 3 cases. We feel that union could be hastened by using the combination of intra-articular and extra-articular fusion in which the acromion process is prepared as a greenstick fracture and placed in contact with the humeral head, as described by Brett.

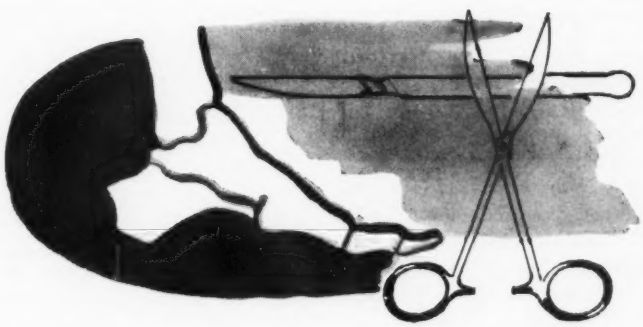
When this type of fusion was done the average time in plaster was 3 months. When the acromion was not turned down it required an average of 5 months.

The authors preferred to immobilize the patient in a shoulder spica at the time the fusion was done. For our cases we make a cast and immobilize the shoulder preoperatively and strive for the optimum angle in the shoulder spica before surgery. The cast is then bivalved and replaced after surgery is done.

Lastly, I should like to ask the authors and any members of the Orthopedic Section of the Southern Medical Association if they have had experience with removal of any or all of the clavicle following shoulder fusion to obtain better range of motion.

Dr. Rountree (Closing). In answer to the first question of Dr. James,—we have had some loss of the angle due to remodeling and shifting of the epiphysis at the shoulder. This was found to be particularly true in the younger age group of patients. We now feel that the operation should not be done in patients younger than 8 years of age. In answer to the second question,—the removal of a portion of the clavicle has been recommended in 2 cases, but not accepted by the patient.

We wish to thank Dr. James for discussing this paper.



Pediatric Problems in Otolaryngologic Practice*

L. J. RUTLEDGE, M.D.,† *New Orleans, La.*

A number of interesting situations may be encountered in children of especial interest to the otolaryngologist. These have been reviewed.

SEVERAL INTERESTING DISEASES that occur primarily or exclusively in the pediatric age group, but are of potential otolaryngologic importance have received emphasis recently in the medical literature. These include agammaglobulinemia and hypogammaglobulinemia, cat scratch disease, bilateral choanal atresia, and infantile cortical hyperostosis. The salient features of each entity will be presented, with emphasis on the otolaryngologic aspects.

Agammaglobulinemia and Hypogammaglobulinemia

Since 1952, when Bruton[1] first described congenital agammaglobulinemia in a child, many reports have appeared concerning the effects of deficiency of this antibody in man.[2-5] Gamma globulin is a fraction of the plasma proteins and, as one of the principal circulating antibodies, plays a vital defensive role against infection. Four clinical types of deficiency of gamma globulin are now distinguishable:[2]

(1) *Transient* or *physiologic hypogammaglobulinemia of the newborn.* Maternal antibodies, passively transferred through the placenta, help protect the infant up to the age of 4 to 6 months, when his reticuloendothelial system becomes mature enough to begin producing gamma globulin. If his productive capability is delayed beyond this age, serum antibodies will fall to low levels.

(2) *Congenital agammaglobulinemia.* This disorder is transmitted by the mother to one-half of her male offspring as a sex-linked Mendelian recessive defect. From birth the infant is unable to produce adequate amounts of gamma globulin, but clinical signs and symptoms are not usually manifest until 9 months to 3 years of age.

(3) *Acquired hypogammaglobulinemia.* The ability to synthesize adequate amounts of gamma globulin is, for some unknown reason, lost. The disturbance is not hereditary and occurs in either sex. It is relatively rare in childhood.

(4) *Secondary hypogammaglobulinemia.* Plasma levels of gamma globulin may be lowered by interruption of its production as a result of leukemia, lymphoma, total body irradiation, or administration of nitrogen mustard, or the fall may follow excessive losses, as occurs in nephrosis or extensive burns.

All four types of deficiency of gamma globulin make the patient extremely susceptible to infection with common pyogenic bacteria, such as staphylococci, beta hemolytic streptococci, pneumococci, *Hemophilus influenzae,* and meningococci. Oddly enough, viral infections present no unusual problem.[3] The patient will have a quick succession of severe, and often bizarre bacterial infections, such as pneumonia, otitis media, or septicemia, or a stubborn chronic infection will develop such as otitis media, sinusitis, or bronchiectasis. A striking physical finding in patients with the congenital or acquired form is the paucity of lymphoid tissue. The tonsils are small and smooth and lack a follicular pattern. Lymphoid tissue is absent on the posterior pharyngeal wall, and lymph nodes do not enlarge significantly even in response to infection (Fig. 1). These physical findings, along with a history of infections, should alert the physician to the possibility of such an underlying immunologic defect. Supporting evi-

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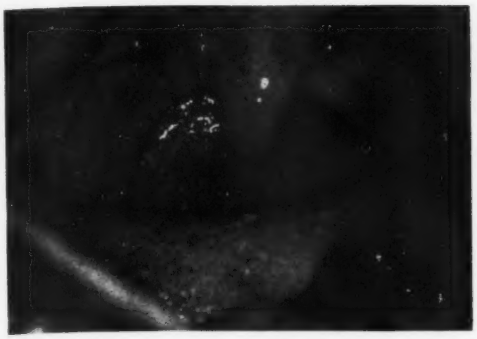
FIG. 1



The oropharynx of an 8 year old child with congenital agammaglobulinemia. Note that lymphoid tissue is absent. (Photograph courtesy of Dr. R. V. Platou.)

dence may be obtained by failure of conversion of results of a Schick test from positive to negative after adequate diphtheria immunization, lack of isohemagglutinins if the blood type is other than AB, or a high plasma albumin-globulin ratio. The diagnosis may be confirmed by electrophoretic analysis of the serum (Fig. 2), or by use of the precipitin test to measure circulating gamma globulin, which is, unfortunately, not generally available.[4]

The basic consideration of therapy is prevention of infection by restoration of circulating gamma globulin to a protective level. This may be achieved by intramuscular administration of pooled gamma globulin in doses of 0.1 Gm./kg. each month.[3]

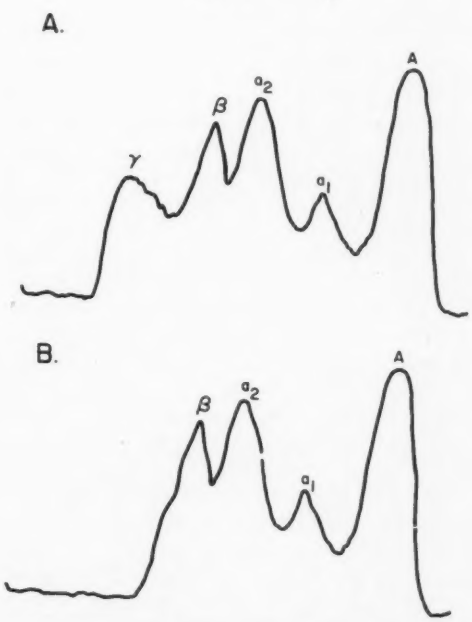
If this disorder is detected and adequate replacement therapy is instituted before occurrence of complications, such as bronchiectasis, the prognosis is usually good. In about one-third of children with the congenital or acquired forms, however, rheumatoid-like arthritis develops.[4]

Cat Scratch Disease

Although cat scratch disease was first recognized in 1932 by Foshay[6] in Cincinnati, it was not until 1950 that the first descriptive report was published by Debre and associates[7] in Paris. The etiologic agent has not yet been isolated but is probably viral; it is usually transmitted by a cat scratch but occasionally by inhalation or conjunctival contact. The disease occurs primarily in children and is typical in pattern: 3 to 14 days after a cat scratch, an ulcerative or papular lesion develops at the site of injury, after which the regional lymph nodes become large and tender, eventually suppurating in 30 to 40% of patients. Fever, malaise, and headache are associated complaints.

The cervical lymph nodes are primarily involved in 20% of patients[8] (Fig. 3); in such cases the problem is to differentiate this disease from other, more serious causes of large masses in the neck in children, such as infectious mononucleosis, tularemia, thyroglossal duct cyst, sporotrichosis, tuberculous adenitis, Hodgkin's disease, and lymphosarcoma. Fortunately, differentiation may be accomplished by means of a specific skin test and histologic examination of an affected lymph node. Aspirated pus from such a node of a patient known to have the disease may be converted into an antigen for intradermal testing of suspected patients by the dilution and heating method of Frei.[9] In 95% of patients tested, this antigen will produce an indurated area that measures 0.5 to 1.0 cm. in diameter. The histopathologic appearance of an affected lymph node closely resembles that of lymphopathia venereum and consists essentially in a

FIG. 2



(A) Normal electrophoretic pattern of serum. (B) Electrophoretic pattern of serum in patient with agammaglobulinemia.

FIG. 3

Suppuration of a cervical lymph node due to cat scratch disease. (Photograph courtesy of Dr. R. V. Platou.)

granulomatous reaction with focal areas of necrosis, fibrosis, and formation of tubercles.[10]

Results of antibiotic therapy are not spectacular, but the course of the disease is benign, and the lymphadenitis eventually resolves within one to three months.

Bilateral Choanal Atresia

As early as 1853, Emmert,[11] a German physician, described the first case of bilateral choanal atresia in a 7 year old boy upon whom he successfully operated. This rare congenital anomaly is produced embryologically by failure of absorption of the bucconasal or buccopharyngeal membrane,[12] with resultant bony or membranous occlusion of the posterior choanae (Fig. 4). Since infants do not acquire the ability to breathe through their mouths until after the second week of life, persistent nasal obstruction will precipitate frequent and severe cyclic attacks of cyanosis, dyspnea, and feeding difficulty. In any newborn infant with asphyxia neonatorum, the patency of his nasal airway should be tested by passage of a probe or a small rubber catheter through each nostril. The site and character of an obstruction discovered may be determined by lateral roentgenograms of the head after the nasal cavities have been filled with a liquid contrast media, such as Lipoidal or Dionosil. Since sudden death from asphyxia or aspiration is not uncommon as a result of this condition, choanal atresia should be considered an emergency in the newborn, and steps be taken to avoid these hazards as soon as the diagnosis has been established. Feeding by gastric tube and constant maintenance of an open oral airway are essential.

Many surgical approaches[12-14] have been proposed for correction of choanal atresia but, as Hough[13] aptly stated, most of these have been designed for older infants and children. Although the respiratory distress may be relieved by tracheotomy, this procedure should be avoided because of its appreciable case fatality rate in infants. Factors that limit the type of surgical approach in newborn infants include the size of the infant's mouth, poor development of maxillary sinuses, and intolerance to prolonged surgical trauma and anesthesia. Hough[13] recommended careful penetration of the obstruction with a trochar, followed by insertion of polyethylene tubes to be left in place for several months. This will usually provide permanent correction for membranous atresia but not for the bony type, which requires correction when the infant is older and the surgical risk lower, preferably by transpalatine approach.[14] Correction of the defect is followed by normal growth and development.

Infantile Cortical Hyperostosis

In 1945, Caffey and Silverman[15] and Smyth and associates,[16] independently, described a

FIG. 4

Anatomic dissection of the head of an infant with bilateral choanal atresia. The nasal septum has been completely removed. The arrow indicates the site of vomerine obstruction. (Photograph courtesy of Drs. Edward Peebles and John Dent.)

syndrome that has come to be known as Caffey-Smyth's disease, Caffey's disease or, more generally, as infantile cortical hyperostosis. The etiology of this disease is obscure. Its onset is always in infants younger than five months of age, but no preference for race or sex has been noted. Clinical manifestations referable to the head and neck are exceedingly common. Typically, slight fever develops in a healthy 9 week old infant, in association with extreme irritability and painful swelling over the mandible (Fig. 5). Frequently, a similar swelling will be present over one or more other bones, such as the scapula or the parietal, frontal or tubular bones.

Most patients have mild anemia and elevated erythrocytic sedimentation rate, but there are no specific laboratory aids in diagnosis other than roentgenography. The disease must be identified from the history, physical examination, and roentgenographic findings. Biopsy is unnecessary. The movable mass of soft tissue is over bone, exquisitely tender, firm and brawny. On roentgenographic examination of patients with early lesions, a slight elevation of the periostium will be observed, with subperiosteal formation of new bone along the diaphysis.[16] In late lesions subperiosteal formation of new bone is pronounced, with considerable increase in the diameter of the involved bone.

FIG. 5

An infant with hyperostosis affecting the mandible. (Photograph courtesy of Dr. R. V. Platou.)

In infants, this disease must be differentiated from other causes of severe periosteal reaction, such as vitamin A intoxication, trauma, osteogenic sarcoma, leukemia, syphilis, osteomyelitis, and scurvy. The mandible is affected in 77% of patients, many of whom appear to have parotitis.[17]

The clinical course of infantile cortical hyperostosis is characteristically fluctuating, marked by cyclic periods of quiescence and activity. Therapy with cortisone or adrenocorticotropic hormone may shorten the course of the disease, which will otherwise require 3 to 20 months for complete recovery.

Summary

Four separate disease entities which occur primarily or exclusively in children and which have aspects of potential otolaryngologic importance have been discussed. These diseases are agammaglobulinemia and hypogammaglobulinemia, bilateral choanal atresia and infantile cortical hyperostosis.

Deficiency of gamma globulin should be suspected in any patient with an unusual susceptibility to recurrent or bizarre pyogenic infections and definite identification of the disorder is possible by electrophoretic analysis of the patient's serum. Cat scratch disease is readily differentiated from other causes of significant enlargement of a lymph node by a specific skin test antigen and histologic examination of an involved lymph node. The patency of the nasal airway should be tested in any newborn infant with asphyxia neonatorum. If bilateral choanal atresia is found to be the cause of respiratory distress, immediate surgical correction of the obstruction is mandatory. Cortical hyperostosis may be differentiated from other causes of periosteal reaction in infants by its fluctuating course, the presence of a painful swelling over bone, and characteristic roentgenographic findings.

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Discussion (Abstract)

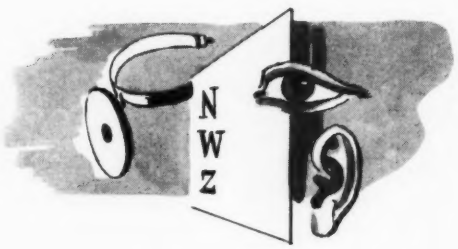
Dr. Harold G. Tabb, New Orleans, La. I want to thank Dr. Rutledge for bringing to our attention some of these joint pediatric and otolaryngologic problems which we may encounter in our practices. He is highly qualified to speak of these problems since in addition to being a certified pediatrician he is a board eligible otolaryngologist on the full-time staff of our department at Tulane University School of Medicine. There are a few comments I should like to make about two of the conditions which have been described and which I have encountered in practice. These are, (1) the gamma globulin deficiencies, and (2) congenital atresia of the posterior nares.

Recurrent and unexplained upper respiratory infections occurring in a child who is taking antibiotics does not always mean this person has a gamma globulin deficiency. Underlying residual infection from inadequate therapy is still the most likely offender. There is an economic consideration to the administration of gamma globulin. It is expensive and usually requires maintenance therapy over a period of time. For instance the usual dosage is 0.1 Gm. per kilogram of body weight per month. A 22 pound child would thus require $18.00 worth a month. A 150 pound man would need an amount worth $120.00 per month and, once started, this is a constant outlay. Along this line, I would like to ask Dr. Rutledge if there is any therapeutic value to single doses of gamma globulin?

We have had the opportunity of handling a few cases with congenital atresia of the posterior nares. The bilateral occurrence of this condition in the newborn requires the immediate establishment of an airway for preservation of life. The immediate airway is usually by mouth, and is established by inserting a feeding tube or an oral airway to break the seal between the base of the tongue and oropharynx. The otolaryngologist is then called upon to establish a nasal airway. The simplest way is the best way. This is to rupture the obstruction by instrumentation and maintain the opening with polyethylene tubes. This procedure, although simple, is not without risk in this age group. (The newborn which you see in this slide did not survive it.) It should be performed as quickly as possible and under a mild local or no anesthesia at all. If an adequate nasal airway is not maintained a surgical reconstruction of the posterior nares is done utilizing a transpalatine approach. This may be performed as early as 6 months of age in bilateral cases and around 4 years of age in unilateral cases. It has been used successfully by many authors. The surgical technic which I prefer was outlined by Owens in 1951. It utilizes the transpalatal approach to remove the obstruction under direct vision and to reconstruct the posterior nasal choanal by repositioning mucosa to cover denuded areas. To date I have had no failures with this method.

Dr. Rutledge has given us a most informative paper and I enjoyed his presentation.

Dr. Rutledge (Closing). If the diagnosis of agammaglobulinemia and hypogammaglobulinemia is suspected in a patient, laboratory confirmation should be obtained rather than using the empiric administration of scattered doses of gamma globulin.



The Anesthesiologist's Contribution to Modern Obstetric Management*

STEWART A. WILBER, M.D.,† *Houston, Tex.*

It seems probable that the anesthesiologist will need to play a greater role in the delivery room, where he has much to offer in a continued reduction in maternal and perinatal mortality.

THE MOTTO OF THE ANESTHESIOLOGIST reads simply, "We safeguard those who sleep."

If we accept this as a working proposition, I believe that in the main our greatest contribution in the field of obstetric management is the undivided attention the anesthetists are giving to the parturient woman, beginning upon her admission to the labor suite, and continuing through, (1) her labor and its concomitant misery and premedication, (2) her delivery, and (3) her return to a normal physiologic state in the postanesthetic ward and return to her room.[1-4]

This one great contribution, the merits of which are documented world-wide by a constantly decreasing maternal and fetal mortality and morbidity, has brought much increased attention to three main considerations. These are: (1) the normal physiologic changes that occur during pregnancy; (2) the judicious application of the old, and the development of new technics and methods to this special patient, the parturient female, and (3) the organization of an anesthesiology service department which can provide constant attention in anesthesia for the woman in labor and delivery.

As an aside and as a paradox, it should be mentioned that while over-all perinatal morbidity and mortality are decreasing, the administration of anesthetics has become the fifth highest mortality factor in obstetric management.[5,6] In other words, the over-all infant death rate of 26 per 1,000 deliveries is more and more attributable to anesthesia, although the total number of deaths due to anesthesia has fallen. The implication becomes clear and the challenge is out. We must decrease anesthesia's contribution to this death rate.

A few statistics may be in order to assess what this challenge really is. The latest complete reports on infant mortality, in 1955, in New York City indicate an infant mortality rate of 26 per 1,000 deliveries, a reduction from 100 per 1,000 in 1915, during which time the astronomical figure of 60 maternal deaths per 10,000 live births was reduced to 5 per 10,000.[7-9]

The perinatal death rate, those deaths occurring after 20 weeks of gestation, plus those occurring at birth and those occurring within 7 days after birth is 35.6 for the United States as a whole.[9]

Of those infant deaths, 75% are neonatal, occurring in less than 28 days after birth, while 90% of these occur in the first week.[7] Of this 90% dying in the first week, 80% die of, (1) immaturity at the rate of 37%, (2) anoxia and conditions of abnormal pulmonary ventilation, 26%, and (3) birth injuries, 10 per cent. It is sad but true that progress in saving lives of infants in the first week of life has been slight, the greatest reduction in infant mortality having been affected in those infants who have survived for one month.[10]

It is further estimated that 35% of all neonatal deaths are preventible, with special reference to prematurity, and the difference in death rates on service and private wards.[11]

Lastly, it is a fact that perinatal and maternal deaths at delivery stood fourth in place as cause of death at all ages in the United States in 1955.[9]

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Perhaps it is here that we anesthesiologists can contribute our bit, referring particularly to the prevention of fetal asphyxia, both during labor and delivery, and by aggressive infant resuscitation upon completion of delivery.[12] It is with reference to postnatal depression in the infant that consideration of premedication, anesthetic agent, and technic may be most valuable. Hingson and Hellman,[13,14] in referring to the Baltimore Anesthesia Study, state that general anesthesia, either inhalation or intravenous, produced many more sluggish infants than regional anesthesia, such as spinal, pudendal and caudal block. Yet the over-all death rates were not significantly different.

This is substantiated by Apgar[15] who used the same approach as that of the Baltimore Anesthesia Study group. Hingson and Hellman state further, and I quote, "the question of infant survival is not answered by the reaction of the infant at birth, and from clinical impression, one may doubt whether one bears any relation to the others."

It seems certain that the judicious use of technics that are available and indicated for the situation at hand, coupled with 24 hour a day supervision of the obstetric clinic by the anesthesiology staff will lead to truly equal infant survival for all methods of anesthesia. This suggests that we who do obstetric anesthesia must be anesthesiologists in every sense of the word, versatile and familiar with all the many technics at hand and ever ready to develop new attitudes and approaches to this fascinating problem.

Before a consideration of technic, choice of anesthesia, and management of the obstetric patient, it may be well to review the physiologic changes[16] which occur in the normal pregnant women and their implications with respect to the pathologic pregnancy and the modifications of our technics and their management.

Physiologic Considerations

The pronounced cardiovascular changes that occur are: increases in total blood volume, plasma volume, red and white cell volume, and in total plasma protein. In spite of these total relative increases, normal values for hemoglobin are given as 11 to 12 Gm., for red cell count, 3.75 million, and for hematocrit, 35 per cent. Concentration of platelets remains the same, while fibrinogen is actually and relatively increased by as much as 40 per cent. There is an increase in cardiac output which may be as high as 45% by the end of the second trimester, falling slowly to normal as the third trimester progresses to term.

These increases in blood volume, total hemoglobin concentration, and cardiac output, combined with a fall of diastolic pressure, an elevation of pulse pressure, and a decrease in peripheral resistance, result in a greater peripheral blood flow, providing for the carriage of more metabolites and a reduction of excess heat caused by increase in metabolic rate.

As these cardiovascular changes proceed, there is a 35 to 40% increase in minute volume, characterized by a change of breathing from abdominal to thoracic, a 30% increase in tidal volume, an increased rate, and a greater aeration of the lungs per unit of time. This increase in respiratory activity is necessitated by a 10% increase in oxygen utilization paralleling a 10% increase in metabolic rate. Associated with this increase in oxygen demand is a shift to the right of the oxygen dissociation curve, resulting in a release of oxygen at lower tensions than normally occurs.

There is a marked increase in sodium, nitrogen, and water retention, with a weight gain of 20 to 25 pounds, 40% of which is due to the reproductive changes and 60% to sodium and water retention caused by the steroid-like sex hormones which are at high levels during pregnancy. There is a compensated alkali deficit represented by a lowering of the carbon dioxide combining power, and a tendency to ketosis produced by a high dietary uptake of fat. A deficiency of (an estimated loss of 500 to 700 mg.), and an inability to metabolize iron in the last trimester of pregnancy produces a real anemia, which is in contradistinction to other mineral elements, most of which are retained in excess of actual needs.

It is clear that the pregnant woman with rheumatic mitral disease,[16,17] septic and toxic disease, hyperthermia, and acid base disturbances,[18] is suffering from additional stress, over and above the normal changes that occur in pregnancy with resultant loss of respiratory and cardiovascular reserve. Accordingly, we must look upon these consistent

changes of pregnancy as being of pathologic implication, when complicated by true functional disease.

As we have pointed out, the choice of anesthetic agent and technic seems to have little effect on over-all infant mortality rates.[13-15] It should be emphasized, however, that this is true only if the choice of that technic has been made wisely and then handled expertly. The two main classes of technic in handling the problem of safe obstetric anesthesia are, (1) general anesthesia, and (2) local or regional block.

Methods of Anesthesia

The general anesthetic technics are indicated in the patient who has an empty stomach, who is psychologically incapable of accepting regional block, who has pre-existing neurologic disease which will contraindicate epidural or spinal blockade, and who needs complete uterine relaxation for a tetanic uterus, Bandel's ring, full-breech delivery[19] or version. Contraindications are prematurity, a full stomach, severe toxemias (medical and obstetric), upper respiratory infections, and a severely depressed mother from any cause.

Positive indications for regional anesthesia include: (1) an emergency in a patient with a full stomach; (2) the alert, cooperative and willing patient; (3) the ever-present danger of fetal depression from any cause (premedication and inhalation agents); and (4) the severe toxemias and metabolic disturbances as mentioned above.

The greatest contraindications to spinal anesthesia are hypovolemia and shock.[20] One will recall that the normally pregnant woman is hypervolemic, though relatively anemic, a physiologic protection against blood loss. If she is *hypovolemic* upon admission to the delivery ward, she lacks this newly developed protection and, as a consequence, is less able to tolerate the vasomotor depression which may follow subarachnoid or epidural sympathetic blockade. Full-breech extraction,[19] severe hypertension, pre-existing neurologic disease, and the patient's refusal to accept block are also contraindications to spinal anesthesia, unless they are outweighed by specific indications for spinal block.

The indications for local technics, such as pudendal, caudal, and epidural block are essentially the same as those for spinal,—the contraindications being again the inability of the patient to accept local anesthesia, the fact that larger amounts of the drugs are required for these technics than with spinal anesthesia, and the fact that in caudal anesthesia, which is technically more difficult, failures are more common.

The management of any of these technics with their inherent hazards depends very much upon you, the anesthesiologist, your attitude toward the problem at hand, and the considerations of the obstetrician doing the delivery. If general anesthesia is to be used, light planes are indicated with the specific reservation that adequate anesthesia be established before manipulation begins. If maternal oxygen concentration is lowered by depressing respirations only slightly, we markedly diminish the ability of the fetus to obtain adequate oxygen from the placental blood supply.

In complicated deliveries (breech presentation, cesarean section, ruptured uterus, placenta previa, or premature separation), the status of the patient at the time and the availability of blood and replacement therapy of all types have to be considered before one can make a choice as to the anesthesia. As a rule, unfamiliarity with any one technic should contraindicate its use and would suggest the use of a technic proved successful in the anesthetist's hands. A major exception to this rule is the condition of shock, the most positive contraindication to the use of spinal anesthesia. In such a case, well-managed general anesthesia, or preferably pudendal and/or local block would be far safer than spinal anesthesia, even though one may be more familiar with the latter.

Resuscitation of the Infant

The problems of resuscitation of the infant offer an active role for the anesthesiologist in fetal depression and apnea. Maltreatment of the neonatal infant is the most common error in delivery rooms across the country. What a shame it is, after nine hard months, for both family and doctor to lose an infant, merely because immediate steps were not taken to establish full, regular spontaneous respirations which are taken for granted in the normal adult, even by some anesthesiologists. The causes for this depression, in themselves,

suggest the proper therapy,—what are they?—(1) over narcotization and anesthetization of the mother with consequent depression of the infant;[21] (2) obstructive respiration in the mother due to a poor airway with a lowered oxygen tension directly reflected to the infant; (3) the actual trauma of birth, tentorial tears and hemorrhage; and (4) cerebral concussion ensuing from passage through the birth canal.

Infant resuscitation should be begun immediately if there is more than a 60 second delay in onset of spontaneous respiration.[22] Technics which are contraindicated include: (1) the use of hot and cold baths; (2) flexion and extension of the infant; (3) pounding and other mutilating procedures to the child; (4) rectal stimulation; (5) the use of stimulating drugs, particularly such potent stimulants as metrazol and picrotoxin, without a thorough knowledge of their hazards and their effectiveness. What can be done without trauma is to establish a good airway, remove all contents of the oropharynx and the stomach by adequate aspiration,[23] and employ mild stimulation, such as a flicking of the finger on the sole of the foot to "trigger" spontaneous respiration.

The employment of mechanical artificial respirators, such as the Emerson, Kreiselman and GBL is indicated if spontaneous respirations do not begin in 60 seconds.[24] Mouth-to-mouth respiration, if no other equipment is available, is an excellent technic. It is important that no air be pumped into the stomach. Gastric dilatation with concurrent noxious vagal stimulation and danger of rupture may occur. There should be no delay in passing an endotracheal tube most gently if it becomes apparent that the baby is obstructed below the pharynx and/or, if for any reason, the technic of artificial respiration chosen is ineffective. The presence of breath sounds as shown by the stethoscope, and the increase of the fetal heart rate to a rapid normal rate of 120 to 140 from the bradycardia of anoxia (70 to 80), will determine the adequacy of therapy.

The question of the pressures required in artificial respiration has been argued back and forth for many years. Pressures ranging from 30 to 50 cm. of water have been shown necessary for inflation of the atelectatic rat lung, and this probably will apply to the human infant, with safety, provided the period of applied pressure does not exceed 0.2 to 0.5 seconds. Our main considerations, then, in infant resuscitation are: (1) establishment of an open airway; (2) the removal of secretions from the pharynx and the stomach to prevent regurgitation and aspiration at a later hour; and (3) the provision for an artificial means of respiration provided the infant is not spontaneously breathing.

Failure in attempts at resuscitation results because: (1) these considerations have been neglected; (2) there is agenesis, or inadequate development of vital control centers due to prematurity and, (3) permanent damage from hemorrhage or tears in the brain stem resulting during both labor and delivery. Delay in beginning resuscitation should be denounced over and over again if we are going to reduce the number of babies who do not die, but go into infancy and childhood with signs of cerebral palsy, epilepsy, and other neurologic diseases which we term idiopathic, for want of a better etiologic factor.

One last consideration in the handling of the newborn infant should be stressed; that is minimal manipulation of any kind, other than that absolutely essential to provide the establishment and maintenance of a normal respiratory activity. Prolonged high concentrations of oxygen are definitely contraindicated on the basis of retrolental fibroplasia, as has been documented time and again,[25] while temperatures should not exceed 82 to 90° F.

The Ideal in Anesthesia on the Obstetric Service

Bonica and others,[1-6] in excellent reviews, consider the following factors in proper coverage for anesthesiology in an obstetric clinic: (1) there should be 24 hour a day coverage by anesthesia personnel, available at all times *on* the delivery room floor; (2) a fully qualified anesthesiologist should be in charge 24 hours a day, (3) nurse anesthetists should be fully trained and available to provide coverage in keeping with the clinical load with the proviso that they be under constant supervision. Frequent review of their work, technic, and understanding of the physiologic changes that have been discussed above should be carried out. I shall emphasize once again the absolute necessity of having immediately available, on the delivery room floor, professional anes-

thesia personnel. In the obstetric clinic, where these requisites are met, the incidence of fetal mortality and morbidity can be reduced and the dire emergencies that threaten maternal and fetal life can be managed with facility.

In such a department no complication, whether it be simple depression due to too early premedication or the most severe of emergencies,—such as hemorrhage, shock, or ruptured uterus, should be allowed to persist or be treated without consultation with professional anesthesia personnel. The anesthesiologist is qualified to put all of these factors together into a logical sequence and accordingly choose and manage the technic that will best fit the situation at that time. Bonica,[4] in discussing a paper by Lindstrom and Moore,[3] points out that in his experience the best method of discharging their obligation to the hospital is for the anesthesiologists to work as a group. This emphasizes the importance of a well-organized department of resident and staff anesthesiologists and trained nurse anesthetists being available to provide this type of service. The establishment of a regular call schedule with regular hours will reduce the element of fatigue which is encountered in the practice of anesthesia on a solo basis. As a result, the patient is provided safe anesthesia at reasonable fees, a factor that cannot be overlooked if more anesthesiologists are to be encouraged to work in this much-neglected field of anesthesiology.

Even though the anesthesiologist has begun to contribute his time and effort in order to provide better obstetric care, he has found that often his efforts have been unsolicited or unwelcomed by many obstetricians. This is not a condemnation; it is merely an observation that in times past, the cooperation of the anesthesiologist and the obstetrician has not been all that it might be. This is changing. The anesthesiologist is finding that obstetric anesthesia presents a challenge, rather than a chore, a promise for the future, as well as an exciting way of making his livelihood, practicing his vocation in anesthesiology taking care of mother and newborn baby, both before and after delivery.

The professional relationship between the obstetrician and the anesthesiologist is a rather tight-rope type of proposition. The question comes up—who is going to decide whether saddle block or general anesthesia is to be used? The anesthesiologist should be the man capable of making these decisions once he has determined the needs of the patient and the desires of the obstetrician. The anesthesiologist is a physician, first and foremost. He has to be aware of the normal mechanisms and processes that occur during pregnancy and labor, and of the manipulative or surgical technic that may be necessary for successful completion of labor. If he is aware of these things, he can recognize trouble before it begins. It is very elemental that the interruption of a pathologic process, once it has begun, is far more difficult and hazardous than if it can be prevented in the first place.

Restorative therapy, instituted for impending shock, and the periodic checking of the fetal heart leading to early diagnosis of fetal depression, as represented by slowing of the heart rate exemplifies preventive medicine as it can be practiced in obstetrics. If necessary, all can be put in readiness for immediate transfer of the patient to the delivery room or the operating room for whatever treatment has to be instituted. These things can be done only by close cooperation of the anesthesiologist-obstetrician team, which is available on the delivery room floor 24 hours a day.

Obstetric anesthesia is an active and aggressive aspect of medical practice which cuts across all fields of medical endeavor. It is very rewarding psychologically to the patient, her family, the obstetrician, and to the anesthesiologist who will take the time and effort to work with these problems. Professional satisfaction will certainly follow in the footsteps of greater perinatal salvage and maternal well being, credit for which, must in no small part, be attributed to the obstetric anesthesiologist.

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Discussion (Abstract)

Dr. Eugene L. Slataper, Houston, Tex. I enjoyed your paper, particularly your emphasis on the anesthesiologist taking more interest in obstetric anesthesia.

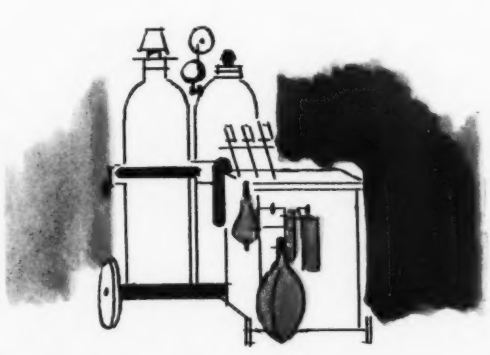
Your review of the statistics on the mortality and morbidity of obstetrics certainly shows the need for improving the anesthetic care of the obstetric patient, especially as it concerns the infant death rate.

Obstetric anesthesia in the past has always been relegated to untrained personnel. Drs. Bonica, Moore, Apgar, Hingson, and others stress the need for proper anesthetic management of the obstetric patient. All of our public relations stress the value of the anesthesiologist at the head of the table; in most cases this means surgical patients. We can no longer avoid our duty to the obstetric patient just because of the inconvenience of the hours. At our hospital (St. Luke's Episcopal) we provide 24 hour coverage for both surgical and obstetric patients. Group private practice is the only answer to the inconvenience, since one anesthesiologist must stay at the hospital with another available for second call. Nurse anesthetists are employed by the hospital for obstetric anesthesia but are under supervision of the anesthesiologist, who acts in the more complicated cases and specialized anesthetic procedures. At our hospital the obstetricians are beginning to realize the difference trained personnel can make in the care of their obstetric patients and in the management of resuscitation of the newborn. This is shown by the increasing number of calls for anesthesiologists rather than the nurse anesthetist.

I would also like to mention that obstetric anesthesia is rewarding financially. Since we will always have the care of obstetric patients, obstetric anesthesia could very well buffer the group against a possible recession.

Actually, the day of reckoning is here for the anesthesiologist in that he must realize that obstetric anesthesia is just as much a part of the field of anesthesiology as surgical anesthesia.

Thank you for the opportunity to discuss your very good paper on such a timely subject. I would also like to add that I appreciated getting the point of view of an obstretician as was so well done by Dr. Mickal.



EDITORIALS

COMMERCIAL HEALTH INSURANCE

There has been a long felt need for liaison with the commercial health insurance companies—we have not paid them due attention. Regardless of our feelings about third parties, each and everyone of us in our practice lives in one form or another by third party participation. It would seem that the insurance industry and the medical profession have a common interest in the moulding of the manner and shape of future events that may escape from the Pandora's box of socialization. The term "socialization" is one that has been ridden a bit too hard and perhaps has lost some of its meaning in that anytime it is spoken, we think of socialized medicine first. Actually what we fear more than anything else is total federalization.

Medicine does not want total federalization; but if anyone is more interested in preventing its occurrence, it is the commercial insurance companies. To them total federalization would mean total destruction. By working with the commercial companies, our Blue Shield-Blue Cross programs, along with the medical profession, may find strong allies. There are mutual grounds where we can solve many problems, iron out difficulties, and establish strong coexistence. In discussing and exploring the dangers of federalization with representatives from the commercial insurance companies, we soon learn that their plight is possibly worse than ours.

Medicine in its liaison with the insurance industry has an important job to do. By cooperative thought and diligent efforts individually and collectively, we either can develop something worthwhile or we can let our failure be another step toward the federalization of medicine. We can expect cooperation from the commercial insurance companies, because without us and without free medicine they cannot exist.

Conferences with the insurance people have resulted in impressions and conclusions in keeping with the experiences of similar negotiations with representatives from industry. The findings in both fields are indicative that medicine has many problems in common with all fields of industry, commerce, agriculture, labor, and the individuals working within the framework of government. When one group becomes enslaved or federalized, all other groups are brought closer to governmental control. Within America there is no real reason for any group to be opposed to another. Basically, we all are most likely striving for the same rights and privileges and the same way of life. When the men of medicine gain better insight and understanding of the problems facing our fellow man in this complicated society, we shall be in a better position to evaluate our responsibilities and to furnish leadership worthy of our station in life.

If medicine sets too rigid doctrines, no matter if they are based on tradition and may look valid at the moment, there is a danger that we may close our eyes to changes in the external world and fail to make necessary modifications of our principles and policies. If we investigate, we will find that outsiders who appear to be interfering with our way of practice have accepted creeds, philosophies, and panaceas because of the need. Frequently, we will learn that these people have not made a searching examination of such programs; also, we will realize that they have been accepted not by intellectual evaluation, but through emotional allegiance as a part of class versus class. We shall have to turn to the leaders of all groups involved for understanding, and shall need to present sound reasoning substantiated by facts. In our dealings, no matter how badly some of the points may go against us, we must work on them and, if possible, turn them to the advantage of the future health of our Nation. In commenting on Clarence Darrow as a cross-examiner, Irving Stone stated, "He would never give up examining until he got some comfort out of it. He worked just as carefully on the Judge as he did on the jury." He quoted Darrow as follows: "The most important thing to do is to make the Judge want to decide things your way. They are human beings moved by the same thing that moves other human beings. The point of Law merely gives the Judge a reason for doing what you have already made him want to do." We must keep Darrow's advice in mind in our approach to those with

whom we desire to establish liaison. In our dealings we will come in contact with those who know the outside world better than we and who can help us understand better their ways and philosophies.

In discussing these common problems we must use logic rather than prejudice. We must not put ourselves in the position of being the opposition. We must remember that our country cannot have a health program without a healthy medical profession, capable of furnishing leadership, alert to the problems and qualified to solve them. In the health problems of our nation, we will either lead or follow—this choice is ours.

LENOX D. BAKER, M.D.

STROKES

Strokes "represent chapters in the natural history of systemic diseases such as atherosclerosis, thrombosing or hemorrhagic states." Since new forms of treatment are now available the diagnosis of the type of stroke is most important. These words appear in the Summary of a brief but readable recent review of the Diagnosis and Treatment of Strokes by Wright.[1]

The three most common causes of these episodes are *thrombosis,* usually on a base of atherosclerosis, *embolism* most often due to heart disease with an irregular rhythm, and *hemorrhage* usually secondary to weakness of the vessel wall because of atherosclerosis, congenital malformation or a blood dyscrasia.

The author indicates the importance of attempting to classify strokes on these etiologic bases. It is also obviously necessary to determine the site of vascular occlusion, whether in the carotid system, the basilar-vertebral arterial system, or if it is more peripheral in the cortex. Along with this is the need for estimating the size of vessel involved and the degree of cerebral damage.

The history so essential to the diagnosis of thrombosis of a cerebral artery is probably well known to most readers. The less common gradual occlusion of the internal carotid may go on for months or years and may simulate disease of the middle cerebral artery. Blindness in one eye, often overlooked, is most suggestive of this lesion. On the other hand, the characteristics of vertigo, ataxia, vomiting and the like, of unilateral occlusion in the basilar-vertebral arterial system also may be overlooked. The occlusion of a solitary vertebral artery may give rise to a bizarre series of neurologic symptoms and signs because closure is a slow process. The clinical manifestations may involve structures of the head as well as of one or more of the extremities. The clinical picture of cerebral embolism is usually recognized and related most often to cardiac disease, especially auricular fibrillation, irrespective of its cause. It may occur postoperatively following operations on lungs or heart. The symptoms and signs are related, of course, to the anatomic site of the embolus.

The author discusses the recent studies and theories relative to possible vasospasm in the cerebral vascular bed characterized by recurrent transient manifestations of the same pattern often preceding closure.

Hemorrhagic strokes are said to make up 25% of those found at necropsy. These are also commonly recognized, the blood pressure rising to higher levels in hypertensive persons, and the episode occurring suddenly in persons while engaged in some activity, in contrast to thrombosis, which so commonly occurs during sleep. From necropsy studies there is good reason to believe that recurrent small hemorrhagic strokes are not too rare. Vascular rupture may or may not be associated with atherosclerosis; it may occur from aneurysms, and the increase of these episodes in the aging population raises a question as to their congenital origin in all cases. The anatomic site of the rupture naturally determines the clinical picture.

Though cerebral vascular accidents are the most common lesions with focal components, it must not be forgotten that the localized intracranial lesions also must be considered in diagnosis.

In the consideration of treatment one finds that new methods are much more definitive and deserve the attention of those responsible for the care of patients having cerebral vascular disease.

Preliminary studies indicate a favorable influence of such therapy upon both recurrences and the severity of the residua. Cerebral thrombosis has been studied by Wright and his co-workers in an effort to determine when to use anticoagulants. In their controlled

1. Wright, I.: Strokes—Diagnosis and Modern Treatment: I. Diagnosis, Mod. Concepts Cardiovas. Dis. 28:519, 1959; II. Treatment, ibid. 28:525, 1959.

studies, no subsequent thrombo-embolic or hemorrhagic complications occurred in the treated group which also had a definitely lower mortality rate.

In the presence of intermittent vascular insufficiency, Millikan and associates[2] have found anticoagulant therapy of definite benefit. This seems to have been most clearly illustrated in their instances of thrombosis in the vertebral-basilar arterial system and in advancing occlusion of the carotid system. They believe it is also effective in intermittent vascular insufficiency in these systems but do not have the statistical evidence for it. Others have had similar results in the use of anticoagulants in this type of case.

Wright and his collaborators[3] reported on the prophylactic effect of anticoagulant therapy in heart disease, as measured in terms of cerebral embolism as well as a favorable effect on the number of episodes of vascular "insufficiency" in patients with recurrent cerebral ischemia.

In continuing his discussion of treatment, Wright[1] calls attention to the fact that most fatal cerebral hemorrhages in patients on anticoagulant therapy occur in the presence of hypertension. Though no statistical correlations have been made, he suggests that the *judicious* control of hypertension seems to be in order.

Surgery is coming into the picture as offering a means of treatment in segmental occlusion in the carotid artery. Arteriography is of great aid in the selection of the proper cases for surgical attack.

Lastly, Wright points to the need for early efforts at rehabilitation after cerebral vascular accidents. This would seem to need great emphasis. Frustration, hostility and anxiety because of one's plight make life a questionable asset. However, useful and happy years, within limits, added to life are a different matter, and these depend upon the physical and mental rehabilitation all too often neglected by the attending physician. One might say treatment only begins after the patient has survived his stroke.

Much more study will be needed and will be forthcoming before the management of strokes is crystalized. However, all clinicians must now give careful thought to the process under observation, the anatomic site of disease,—in other words diagnosis and prognosis.

2. Millikan, C. H., Siekert, R. G., and Whisnant, J. P.: Anticoagulant Therapy in Cerebral Vascular Disease—Current Status, J.A.M.A. 166:587, 1958.
3. McDevitt, E., Carter, S. A., Gatge, B., Foley, W. T., and Wright, I. S.: Use of Anticoagulants in Treatment of Cerebral Vascular Disease, J.A.M.A. 166:592, 1958.

25 YEARS AGO

Anterior Pituitary-like Principle in the Treatment of Maldescent of the Testicle.*

"In 1932, Engle described the experimental production of descent of the testicle in immature monkeys by the injection of hormones of the anterior pituitary gland substances obtained from pregnancy urine. Since maldescent of the testicle is a condition for which the physician is not infrequently consulted, it was felt that this observation might open up a new approach to the study and treatment of this developmental defect. . . .

"Lower and Johnston, working with normal adult rats, found that injection of the gonad-stimulating hormone of the anterior pituitary gland resulted in stimulation of the testes as well as of the prostate and seminal vesicles. . . . Brosius and Schaffer noted the repeated production of spermatogenesis following the administration of anterior pituitary-like principle in a patient with complete aspermia with bilateral testicular atrophy following orchitis. Aspermia reappeared after withdrawal of the treatment. . . .

"Although Evans has stated that anterior pituitary-like principle may damage the testicle of the immature male rat, it would seem from the other instances mentioned that such a reaction does not occur in the human being. To the contrary, certain beneficial effects seem to result, such as an increase in the size and weight of the accessory sex organs (the seminal vesicles and the prostate) and an apparent increase in the length, weight and diameter of the spermatic cord. Furthermore, testicular function is apparently restored or augmented by injection of this substance.

"Since anterior pituitary-like principle had not been used in treatment of maldescent of the testicle in the human subject when the work which forms the basis of this report was started in February 1933, an arbitrary dosage was chosen. One cubic centimeter of the commercial preparation containing 100 rat units was administered subcutaneously three times weekly until ten injections had been given. . . .

"The anterior pituitary-like principle of pregnancy urine is apparently effective in causing the descent of undescended testicles when there is no anatomic malformation to act as a mechanical obstruction. When an obstruction exists, a partial descent will occur, but operation will be required to complete the process. In surgical cases, anterior pituitary-like principle is a valuable adjunct in the production of a successful outcome."

*Cohn, Samuel: Anterior Pituitary-like Principle in the Treatment of Maldescent of the Testicle, J.A.M.A. 103:103, 1934.

SOUTHERN MEDICAL NEWS

ALABAMA

The following officers were installed at the 98th Annual Session of The Medical Association of the State of Alabama: President, Dr. William R. Carter, Repton; President-Elect, Dr. Hugh E. Gray, Anniston; Vice-President, Southeastern Division, Dr. James A. Brantley, Troy; State Board of Censors for five year terms, Dr. Wilmot S. Littlejohn, Birmingham, succeeded himself and Dr. Grady O. Segrest, Mobile, succeeded himself.

The following specialty organizations have elected as officers:

Alabama Association of Obstetricians and Gynecologists. President, Dr. Mack Otts, Montgomery; Executive Committeeman, Dr. James French, Montgomery; and Secretary-Treasurer, Dr. William Middleton, Montgomery.

Alabama Orthopaedic Society. President-Elect, Dr. Paul D. Everest, Montgomery; and Secretary-Treasurer, Dr. Kenneth M. Hannon, Mobile.

Alabama Chapter, American College of Chest Physicians. President, Dr. J. Mac Barnes, Montgomery; Vice-President, Dr. James C. Nash, Decatur; and Secretary-Treasurer, Dr. Kellie Joseph, Birmingham.

International College of Surgeons. President, Dr. E. V. Caldwell, Huntsville; Vice-President, Dr. Otis Jordan, Tuscaloosa; Secretary-Treasurer, Dr. Ralph Terhune, Birmingham; and Assistant Secretary-Treasurer, Dr. George F. Douglas, Birmingham.

University of Alabama Medical College Alumni. President, Dr. Donald Cook, Troy; First Vice-President, Dr. William R. Carter, Repton; Second Vice-President, Dr. William K. Wilson, Haleyville; Third Vice-President, Dr. Ira Myers, Montgomery; and Secretary-Treasurer, Dr. George Douglas, Birmingham.

University of Tennessee Medical College Alumni in Alabama. President, Dr. Robert L. Hill, Winfield; and Secretary-Treasurer, Dr. F. T. England, Mobile.

ARKANSAS

Dr. Samuel B. Thompson, Little Rock, has been elected Treasurer of the American Academy for Cerebral Palsy.

Dr. C. G. Swingle, Marked Tree, has been elected Vice-President of the Mid-South Postgraduate Medical Assembly.

Dr. Theo Swinyar, Benton, has announced his acceptance of a surgical residency at the Veterans Administration Hospital in Little Rock, and will take up his duties there this month.

Dr. Paul Henley, El Dorado, has been appointed to the five man National Committee on Medical Discipline.

DISTRICT OF COLUMBIA

Dr. William L. Granatir has been elected President of the Board of Managers of the Washington Institute of Mental Hygiene, succeeding Dr. Winfred Overholser. Dr. Overholser, who had served in the position for 17 years, was made President Emeritus and was elected to the Board for a 3 year term. He was also elected Corresponding Member of the Danish Psychiatric Society at its 50th annual meeting.

Dr. Austin Smith, formerly Editor of *The Journal of the American Medical Association,* has been elected the first full-time salaried President of the Pharmaceutical Manufacturers Association, whose headquarters are in Washington, D. C.

Dr. Thomas M. Arnett, Veterans Administration Area Medical Director in Trenton, New Jersey, has been appointed as a Deputy Director for Planning in the VA Department of Medicine and Surgery in Washington, D. C.

Honorary degrees of Doctor of Science have been conferred on Dr. Fred R. Sanderson, Professor Emeritus of Surgery at Georgetown University School of Medicine; and Dr. Clemens V. Rault, Dean of the Georgetown University School of Dentistry.

Dr. Zigmond M. Lebensohn has been appointed to the American Medical Association's new Committee on Medical Use of Hypnosis.

Dr. Charles W. Clark was recently certified by the American Board of Urology.

Dr. Harold W. Schnaper has been elected to Associate membership in the American College of Physicians.

Dr. Thelma Dunn, Chief of the Cancer Induction and Pathogenesis Section of the Laboratory of Pathology, National Cancer Institute, was honored as Woman of the Year by the Women's Medical Society of the District of Columbia.

FLORIDA

Dr. Richard F. Kidder, Lake Worth, has been appointed a member of the Board of Directors of the Florida Heart Association.

The following officers were elected by the Florida Radiological Society at its 27th Annual Meeting: President, Dr. Russell D. D. Hoover, West Palm Beach; President-Elect, Dr. John S. Stewart, Fort Myers; Vice-President, Dr. Alfred G. Levin, Miami; Treasurer, Dr. Ivan Isaacs, Jacksonville; and Secretary, Dr. John P. Ferrell, St. Petersburg.

Dr. Bernhard Baer, Miami Beach, has been elected one of 16 Regional Vice-Presidents of the national medical fraternity, Phi Lambda Kappa.

Dr. H. Phillip Hampton, Tampa, has been appointed a member of the Medical Advisory Board of the Sears-Roebuck Foundation.

Dr. Maurice J. Jurkiewicz has been appointed Assistant Professor of Surgery at the College of Medicine, University of Florida, Gainesville. He was formerly Instructor in Surgery at the Washington University School of Medicine.

New officers of the North Florida Radiological

Society are Dr. Marvin H. Johnson, Jacksonville, President; and Dr. Paul A. Mori, Jacksonville, Secretary.

Two Miami physicians have been certified by specialty boards, Dr. Harry C. Nelson, Jr., by the American Board of Surgery, and Dr. Ralph J. Fusco, by the American Board of Anesthesiology.

Dr. Simon J. Kemp, Miami, has been elected a Fellow of the American College of Obstetricians and Gynecologists.

GEORGIA

Dr. Bessie Mae Beach, Columbus, has been named to Who's Who in America.

Dr. Robert L. Bennett, Medical Director of Georgia Warm Springs Foundation, is one of 24 distinguished physicians and scientists appointed to the two new advisory committees of the National Foundation to counsel the Foundation on March of Dimes allocations.

Dr. A. H. Letton, Atlanta, has been chosen Secretary-Elect of the Southeastern Surgical Congress.

Dr. Joe Combes, Milledgeville, has been elected President of the Georgia Psychiatric Association.

Dr. S. William Clark, Jr., Waycross eye specialist, has been certified as a Diplomate of the American Board of Ophthalmology. He has also been accepted by the American Academy of Ophthalmology and Otolaryngology.

KENTUCKY

Dr. Carroll L. Witten, Louisville, Secretary of the Section on General Practice of the Southern Medical Association, was elected Vice-Speaker of the Academy of General Practice's Congress of Delegates during the 11th Annual Scientific Assembly of the American Academy of General Practice.

Dr. Carl Cooper, Bedford, who serves as a consultant in the Trimble County Health Department, has been honored by the Kentucky State Medical Association as the citizen contributing the most to public health in Kentucky.

Dr. N. Lewis Bosworth, Lexington, is the new President-Elect of the Southeastern Section of the American Urological Association. Dr. Bosworth is also serving as Chairman of the Kentucky State Medical Association Committee on Public Information and Service.

LOUISIANA

Dr. Milford O. Rouse, Dallas, Texas, President of the Southern Medical Association, has announced the appointment of Dr. Edmond C. Campbell as an Associate Councilor from Louisiana.

The Twenty-third Annual Meeting of The New Orleans Graduate Medical Assembly will be held

Continued on page 51

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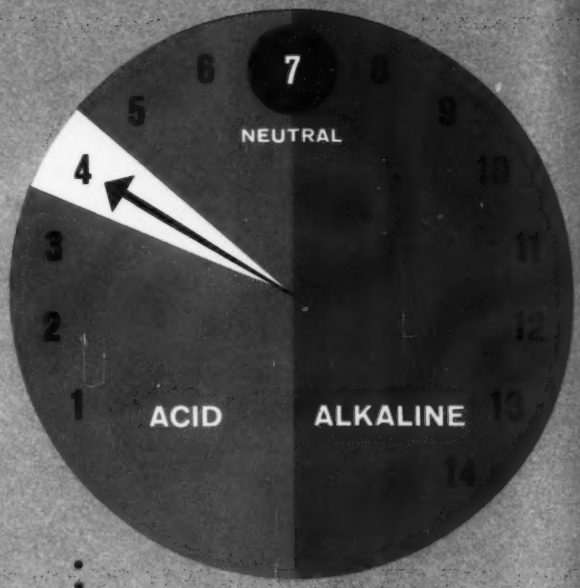

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*New Officers—Elected New Orleans Meeting, 1958.

BOOKS RECEIVED

Gynecologic Radiography. By Jean Dalsace, M.D., Chief of Sterility Service, Broca Hospital, University of Paris; and J. Garcia-Calderone, M.D., Radiologist, University of Paris School of Medicine. 188 pages. New York: Paul B. Hoeber, Inc., 1959. Price $8.00.

The Pneumoconiosis Problem. By Eugene P. Pendergrass, M.D., Professor of Radiology, University of Pennsylvania School of Medicine. 128 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1959. Price $6.75.

Fracture Surgery. By Henry Milch, M.D., Emeritus Attending and Consulting Orthopedic Surgeon, Hospital for Joint Diseases, New York; and Robert Austin Milch, M.D., Peter Bent Brigham Hospital, Boston. 459 pages. New York: Paul B. Hoeber, Inc., 1959. Price $17.50.

1958-59 Year Book of Drug Therapy. Edited by Harry Beckman, M.D., Director, Department of Pharmacology, Marquette University Schools of Medicine and Dentistry. 534 pages. Chicago: Year Book Publishers, Inc., 1959. Price $7.50.

The Roots of Psychoanalysis and Psychotherapy. By S. A. Szurek, M.D., Professor, Department of Psychiatry, University of California School of Medicine. 121 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1959. Price $4.25.

Psychopathic Personalities. By Professor Kurt Schneider, Formerly Director, Psychiatric and Neurological Clinic, University of Heidelberg. 144 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1958. Price $3.75.

The Treatment of Diabetes Mellitus. By Elliott P. Joslin, M.D., Clinical Professor of Medicine Emeritus; Alexander Marble, M.D., Clinical Professor of Medicine, both of Harvard Medical School; Howard F. Root, M.D., Medical Director, Joslin Clinic; and Priscilla White, M.D., Assistant Professor in Pediatrics, Tufts University Medical School. Tenth edition. 768 pages. Philadelphia: Lea & Febiger, 1959. Price $16.50.

General Urology. By Donald R. Smith, M.D., Clinical Professor of Urology and Chairman of the Department of Urology, University of California School of Medicine. Second edition. 322 pages. Los Altos, Calif.: Lange Medical Publications, 1959. Price $4.50.

Orthopaedics in General Practice. By W. H. Gervis, M.A., M.B., B. Ch. (Cantab.), F.R.C.S., Orthopaedic Surgeon, West Kent Hospital, Maidstone, Kent and Sussex Hospital, Tunbridge Wells, Queen Victoria Hospital, East Grinstead. 116 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1959. Price $3.00.

Geographic Ophthalmology. Edited by William John Holmes, M.D., Attending Ophthalmologist, St. Francis Hospital, Territorial Hospital, Hale Mohalu, and Kalaupapa Settlement. 287 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1959. Price $8.50.

Experimentation in Man. By Henry K. Beecher, M.D., The Anesthesia Laboratory of the Harvard Medical School. American Lecture Series No. 352. 80 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1959. Price $3.50.

Eye, Ear, Nose and Throat. Manual for Nurses. By Roy H. Parkinson, M.D., Formerly Head Oculist and Aurist to St. Joseph's Hospital, San Francisco. Eighth edition, with 82 illustrations, 224 pages. St. Louis: The C. V. Mosby Company, 1959. Price $3.85.

Therapeutic Radiology. By William T. Moss, M.D., Assistant Professor of Radiology, Northwestern University School of Medicine. 393 pages. St. Louis: The C. V. Mosby Company, 1959. Price $12.50.

Cancer: Diagnosis and Treatment. Edited by John B. Field, M.D., Assistant Clinical Professor of Medicine, University of Southern California School of Medicine. With 28 Contributors. 776 pages. Boston: Little, Brown & Company, 1959. Price $18.50.

A Short Practice of Surgery. By Hamilton Bailey, F.R.C.S. (Eng.), F.A.C.S., F.I.C.S., F.R.S.E.; and McNeill Love, M.S. (Lond.), F.R.C.S. (Eng.), F.A.C.S., F.I.C.S., both Emeritus Surgeons, Royal Northern Hospital, London; with Chapters by John Charnley, F.R.C.S.; William P. Cleland, M.R.C.P., F.R.C.S.; and Geoffrey Knight, F.R.C.S. Eleventh edition. 1,352 pages with 1,697 illustrations. Philadelphia: J. B. Lippincott Company, 1959. Price $18.00.

Cardiovascular Collapse in the Operating Room. By Herbert E. Natof, M.D., Assistant in Anesthesia; and Max S. Sadove, M.D., Professor of Surgery (Anesthesiology), University of Illinois College of Medicine. 192 pages. Philadelphia: J. B. Lippincott Company, 1958.

Vascular Spiders and Related Lesions of the Skin. By William B. Bean, M.D., Professor of Medicine, Head of the Department of Internal Medicine, The College of Medicine, State University of Iowa. 368 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1959. Price $8.50.

Radiographic Atlas of Skeletal Development of the Hand and Wrist. By William Walter Gruelich, Professor of Anatomy, Stanford University School of Medicine; and S. Idell Pyle, Research Associate, Departments of Anatomy, Western Reserve University and Stanford University Schools of Medicine. Second edition. 256 pages. Stanford, Calif.: Stanford University Press, 1959. Price $15.00.

Textbook of Surgery. Edited by H. Fred Moseley, M.A., D.M., M.Ch. (Oxon.), F.A.C.S., F.R.C.S. (Eng.), F.R.C.S. (C), Assistant Professor of Surgery, McGill University, Montreal. Third edition, 1,285 pages, 738 illustrations. St. Louis: The C. V. Mosby Company, 1959. Price $17.00.

Surgery of the Sympathetic Nervous System. By Sir James Paterson Ross, K.C.V.O., LL.D., M.S., F.R.C.S., F.R.A.C.S., F.A.C.S., Director of the Surgical Professorial Unit, St. Bartholomew's Hospital, London. Third edition. 166 pages. Baltimore: The Williams and Wilkins Company, 1959. Price $8.00.

The Plasma Proteins. By Paul G. Weil, B.A., M.D.C.M., M.Sc., Ph.D., Director, Transfusion Service and Assistant Physician, Royal Victoria Hospital. 126 pages. Philadelphia: J. B. Lippincott Company, 1959. Price $3.50.

INSTRUCTIONS TO CONTRIBUTORS

Exclusive Publication: Articles offered for publication must be contributed solely to the Southern Medical Journal.

Manuscripts: Manuscripts should be original copy, typewritten, double-spaced, with wide margins. Because of lack of space, it is necessary to limit the number of bibliographic references to twenty. Footnotes and references should conform to the following style:

1. Doe, J. E.: What You Should Know about It, New England J. Med. 243:435, 1950.

Illustrations: Black and white glossy prints, preferably 5 by 7 inches, and drawings in India ink on white paper are required. The author's name, number and indication of top, if doubtful, should be attached. Necessary plates not exceeding six, or one and a half pages, will be furnished by the Journal.

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Book Reviews: Books and monographs submitted for review should be mailed to the Editor. Acknowledgment will appear in the Journal. Selection rights reserved.

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Business Address: All correspondence related to membership, subscriptions, advertising, and other business should be addressed to the Southern Medical Association, 2601 Highland Avenue, Birmingham 5, Alabama.

BOOK REVIEWS

The Brain and Human Behavior

Proceedings of the Association. December, 1956. 553 pages, 200 illustrations and 53 tables. Baltimore: The Williams & Wilkins Company, 1958. Price $15.00.

A combination of neurophysiologic, neuroanatomic and neurochemical reports are included in this volume of the Proceedings of the Association for Research in Nervous and Mental Disease. Contributors include Denny-Brown, Jasper, Penfield, Bremer, Nielsen, Gibbs, and Wolff. These, plus many of the others represented here include a significant number of those actively working in the field of behavior.

The section dealing with neuropharmacology and behavior is the most pertinent since it is a new field of neurologic research. The information contained here is quite limited but some of the bibliography accompanying the papers allows opportunity for an extensive survey of this field.

In general this book is highly specialized and will be of interest only to those active in neurologic investigation.

Viral and Rickettsial Infections of Man

Edited by Thomas M. Rivers, M.D.; and Frank L. Horsfall, Jr., M.D. 924 pages. Philadelphia: J. B. Lippincott Co., 1959. Price $8.50.

In contrast to the usual textbook, this beautifully organized and illustrated volume is up to date. Fourteen new contributors as well as the associate editorship of Dr. Frank L. Horsfall have been added since the 1952 edition. There are seven new chapters, including the "Biochemistry of the Virus-Infected Cell" and "Chemotherapy and Virus Infection." The previous chapter on poliomyelitis has been expanded to three chapters. All of the recently discovered viruses are discussed in great detail by leading authorities in this field. As with previous editions, this text should find extensive use in the teaching of medical students and other graduate students of biology. The practicing physician would do well to have a copy of this book on his reference shelf.

The Eye

By E. Howard Bedrossian, B.S., M.D., M.Sc. (Med.), F.A.C.S., Assistant Professor of Ophthalmology in the Graduate School of Medicine of the University of Pennsylvania; Assistant Surgeon, Wills Hospital, Philadelphia, Pennsylvania; Associate Ophthalmologist, Graduate Hospital, Philadelphia, Pennsylvania; Chief of Ophthalmology, Delaware County Hospital, Drexel Hill, Pennsylvania; F.A.C.S.; Fellow, The American Academy of Ophthalmology and Otolaryngology; Fellow, Philadelphia College of Physicians; Fellow, Aero Medical Association. 321 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1958. Price $11.00.

The author has presented a collection of ophthalmological information condensed from textbooks, periodicals, journals, and from his own lecture notes. This covers all aspects of the eye from anatomy, optics, diseases and treatment of the eye and neuro-ophthalmology to ocular emergencies. Since there is so much information presented, it has to be done in more or less abstract form which makes reading somewhat difficult.

The outstanding chapter is that on neuro-ophthalmology and optics in which the author has gone into a little more detail.

This book would be of great value in a review for the American Board of Ophthalmology or for one who wishes to look up material where it is presented in a concise form.

Treatment of Cancer and Allied Diseases

Second edition. Edited by George T. Pack, M.D.; and Irving M. Ariel, M.D. 291 pages. New York: Paul B. Hoeber, Inc., 1959. Price $15.00.

This is the second in a series of volumes concerned with the treatment of cancer and related disorders. An imposing array of specialists have contributed sections to this work which includes a classification of central nervous system tumors, indications for surgical treatment and a detailed consideration of the surgical approach to the various tumors. There are also chapters describing surgical methods for the relief of pain.

This is a very attractive volume which is well illustrated. The illustrations include not only excellent gross and microscopic studies of the various tumors but also fine reproductions of roentgenographic studies illustrating operative exposures as well as an extensive bibliography are other noteworthy features of this volume. This book is recommended to all physicians who are concerned with disease of the nervous system. It deserves a place in all medical libraries.

The Neurologic Examination

By Russell N. DeJong, M.D., Professor of Neurology and Chairman of Department of Neurology, University of Michigan Medical School. Second edition, with 368 illustrations, 1,039 pages. New York: Paul B. Hoeber, Inc., 1958. Price $20.00.

This is the second edition of a very extensive treatise on neurology and neurologic diagnosis. The author has adhered to his original intention of presenting in a very comprehensive manner the relationship of clinical neurology to the basic sciences of neuroanatomy and neurophysiology. Changes in structure and function are correlated with abnormalities encountered in neurologic examination.

In the present edition numerous additions have been made to bring the work up to date although the general outline of the book has not been altered. In the section relating to the motor pathways, some of the more recent views regarding the pyramidal system and the brain stem reticular formation are included.

This book is highly recommended to all students

and residents who are planning a career in one of the neurologic sciences, and it would certainly be of interest to practicing neurologists and neurosurgeons.

CIBA Foundation Symposium on the Neurological Basis of Behavior

Editors, G. E. W. Wolstenholme, O.B.E., M.A., M.B., C.Ch.; and Cecilia M. O'Connor, B.Sc. 387 pages. Boston: Little, Brown and Company, 1958.

This book offers a series of research reports prepared in commemoration of the 100th anniversary of the birth of Sir Charles Sherrington. It presents, now in written form, the papers delivered at the CIBA Foundation Symposium on the Neurological Basis of Behavior in London in the summer of 1957.

As indication of the greatness and breadth of interest and influence of Sherrington, the topics of the reports range from, "The behavior nerve cells" (J. C. Eccles) to "Brain enzymes and adaptive behavior" (M. R. Rosenzweig, D. Krech, and E. L. Bennett), and, "The relevance of some neurophysiological data to behavior disorders" (S. L. Sherwood). Further indication is in the diversity of origins and disciplines of the participants.

For the most part the material presented is new and original rather than repetitious, or even synoptic of earlier publications. In each instance, the authors describe their research in sufficient detail to give the reader a glimpse of the vitality of their projects and the fervor of their efforts. The discussions which follow each paper add immeasurably to the liveliness of the proceedings.

In all, this small volume makes for absorbing reading. The problems discussed and the research described afford the reader a vivid and stimulating view of the rapidly expanding body of fact and changing concepts of the mechanisms of the central nervous system in behavior.

The Practice of Medicine

Edited by Jonathan Campbell Meakins, M.D. Sixth edition, 1,843 pages, with 318 illustrations. St. Louis: The C. V. Mosby Company, 1957. Price $16.00.

The first five editions of this book were the work almost entirely of the author, Dr. Meakins. This sixth edition is entirely different, since he has acted as the editor-in-chief and has had associated with him 24 associate editors, who have assumed the responsibility for areas of their particular interest. These associate editors have then used 87 contributors, who have actually written the various sections of this textbook. Both the associate editors and the contributors are outstanding clinicians and scientists in their particular areas of interest, and thus can speak with authority. Thus this textbook had at the time of its writing the latest information as culled from the world's knowledge in the field of medicine.

The book is illustrated with 318 cuts, the great majority of which are new as compared to those used in the fifth edition and beautifully amplify the written material.

In a book of this size of course it is impossible to review sections by detail, but merely to indicate somewhat the subdivisions in the hands of the associate editors. Under the infectious diseases, for example, one section is devoted to bacterial infections, another to diseases of the viruses, another due to the rickettsiae and the like. For example, there is a section on the chemotherapy of infections. Diseases of the respiratory tract are divided into those of the laryngo-tracheobronchial system and another under diseases of the pulmonary parenchyma.

One can surely recommend this book as a most complete and up-to-date reference book in the field of medicine, both for the internist and the general practitioner.

Handbook of Cardiology for Nurses

By Walter Modell, M.D., F.A.C.P., Associate Professor, Cornell University Medical College; Attending Physician, New York Veterans Administration Hospital; Associate Attending Physician, Bellevue Hospital; and Doris R. Schwartz, B.S., R.N., Assistant Professor, Cornell University-New York Hospital School of Nursing, Public Health Nursing Co-ordinator, Comprehensive Care and Teaching Program, The New York Hospital-Cornell Medical Center. 316 pages. New York: Springer Publishing Company, Inc., 1958. Price $4.50.

"Hankbook of Cardiology for Nurses" is a comprehensive review of all phases of cardiology. Nurses interested in this specialty will find this book most instructive and of great value. Staff nurses engaged in the preoperative and postoperative care of the cardiac patient will be particularly rewarded by the author's meticulous outline of this subject.

Nursing problems encountered in the treatment of heart disease are well evaluated and should enable the public health nurse and the staff nurse to perform their duties with a greater degree of skill, understanding, and confidence.

An excellent chapter is devoted to cardiac and vascular drug therapy and includes the pharmacologic description, the physiologic action, and the necessary precautions which must be undertaken in the use of cardiovascular drugs.

The appendix includes a low sodium diet, the potassium content of various foods and water, and excellent sample menus for the cardiac patient. The medical profession as a whole is indebted to Dr. Walter Modell and Doris R. Schwartz for their excellent contribution to the nursing profession.

Inhalation Analgesia in Childbirth

By E. H. Seward, M.A., D.M. (Oxon.), F.F.A.R.C.S., D.Obst., R.C.O.G., Consultant Anaesthetist, High Wycombe Group of Hospitals; and R. Bryce-Smith, M.A., D.M. (Oxon.), Nuffield Department of Anaesthetics, University of Oxford. 56 pages. Springfield, Ill.: Charles C. Thomas, Publisher, 1957. Price $1.50.

In this handbook the material is presented in a superficial dogmatic form directed toward teaching midwives some simple anesthetic procedures. It is not useful to persons interested in a basic knowledge of the subject such as is required for adequate understanding and safe handling of the problem of obstetrical analgesia.

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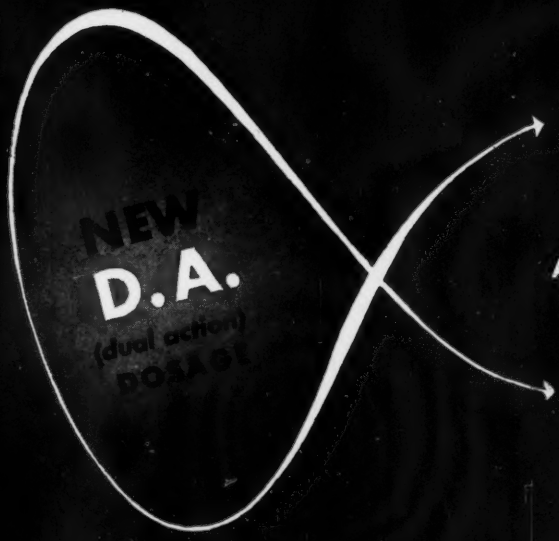

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Continued from page 881

March 7-10, 1960, headquarters at The Roosevelt Hotel. The following officers and members of the Executive Committee have been elected for this year: Dr. Ambrose H. Storck, President; Dr. M. E. St. Martin, President-Elect; Dr. Barrett Kennedy, First Vice-President; Dr. Ralph M. Hartwell, Second Vice-President; Dr. Warren H. Hebert, Third Vice-President; Dr. Mannie D. Paine, Jr., Secretary; Dr. Boni J. DeLaureal, Treasurer; Dr. H. Reichard Kahle, Director of Program; Dr. W. E. Kittredge, Assistant Director of Program; and Dr. Joseph W. Wells, Assistant Director of Program. Members of the Executive Committee include Drs. J. O. Weilbaecher, Jr., J. Theo Brierre, Max M. Hattaway, Lee D. McLean, and John G. Menville.

Dr. Jack C. Greer, Instructor in Pathology, Louisiana State University School of Medicine, has been awarded a five year fellowship by the Public Health Service. The program is administered by the Division of General Sciences of the Public Health Service's National Institutes of Health.

Dr. Ralph V. Platou, Professor and Chairman of the Department of Pediatrics, Tulane School of Medicine, has been selected as a member of the Residency Review Committee in Pediatrics, which acts in an advisory capacity to the American Board of Pediatrics, the Association of American Medical Colleges, and the American Medical Association and has responsibility for approval or disapproval of all pediatric graduate training programs in hospitals or schools in this country and Canada. Dr. Platou has received a scroll from the Academy of Pediatrics in appreciation of his eight years of service as Editor of their official publication.

Dr. Robert G. Heath, Professor and Chairman of the Department of Psychiatry and Neurology, Tulane School of Medicine, is the President-Elect of the New Orleans Society of Neurology and Psychiatry.

MARYLAND

Dr. J. Morris Reese, Baltimore, Associate Councilor from Maryland to the Southern Medical Association has been elected to serve as President of the Baltimore County Medical Association. Dr. Reese has also been appointed as Medical Advisor on the Advisory Committee to the Baltimore County Health Department.

Dr. Raymond K. Thompson, Baltimore, has been elected Secretary of the Neurosurgical Society of America.

MISSISSIPPI

Dr. Stanley A. Hill, Corinth, has been installed as President of the Mississippi State Medical Association. Dr. Hill is also a member of the Editorial Board of the Southern Medical Association.

Dr. Lawrence W. Long, Jackson, has been selected Vice-President of the American Association of Railway Surgeons. Dr. Long is MSMA's Speaker of the House of Delegates and Chairman of the Council on Medical Service.

Continued on page 58

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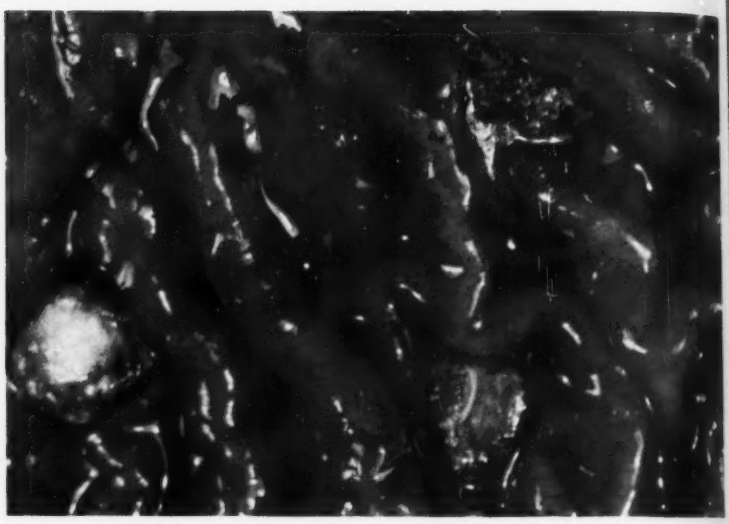

Fig. 1 – Gastrectomy specimen from patient with chronic duodenal ulcer. Two regular aspirin tablets administered 45 minutes prior to surgery. Each of these aspirin particles was found to be firmly adherent to the gastric mucosa, but not imbedded within it, as often happens. Damage was found under each particle.

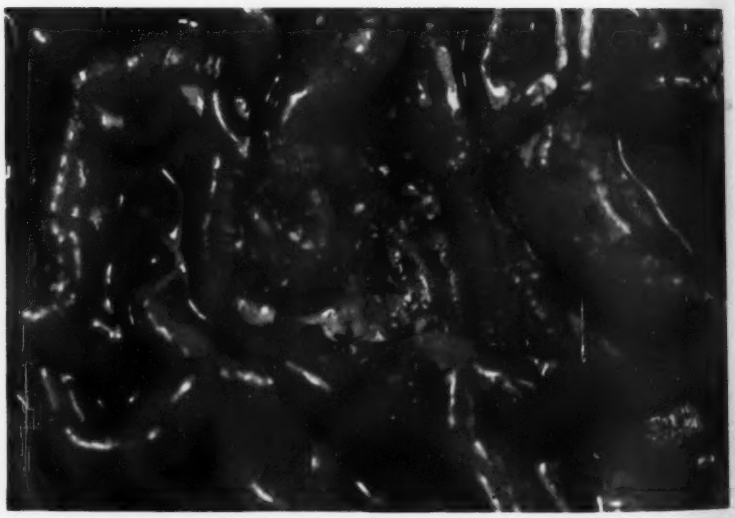

Fig. 2 – Gastric mucosa, showing damage found under aspirin particle. At the center of the lesion is a deep, circular erosion. There is surprisingly little hyperemia surrounding the lesion. This may be due to the early tying off of the gastric arteries during the operation.

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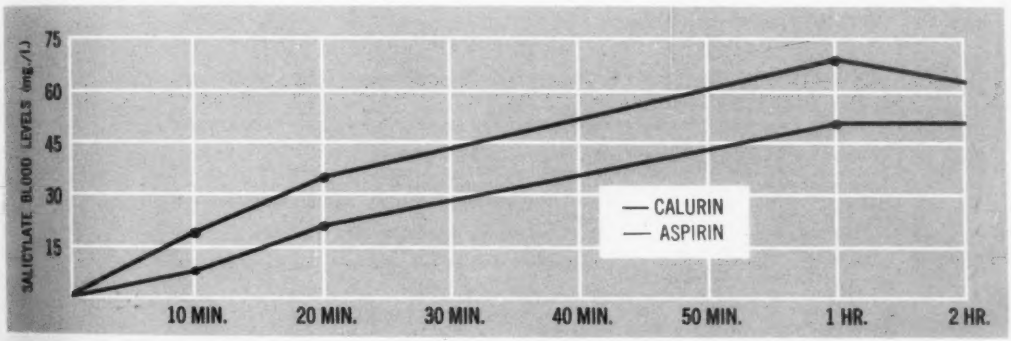
Chief among the drawbacks to aspirin usage is gastric intolerance. This ranges from mild upset and "heartburn" to severe hemorrhagic gastritis,[1-10] and is particularly important in patients on long-term, high-dosage therapy. Muir and Cossar report and reconfirm that aspirin is the causative factor in an average of 1 out of 8 cases of gastroduodenal hemorrhage. This may be associated with the relative insolubility of aspirin, which results in its remaining in particulate form after dispersion in gastric contents. Studies performed in conjunction with gastrectomy[4,5] and gastroscopy[2] have shown aspirin particles firmly adherent to the gastric mucosa and imbedded between rugae (Fig. 1). Reactions varying from mild hyperemia to erosive gastritis (Fig. 2) have been reported to occur in the areas immediately around such particles.[2,4,5,9]

One of the methods designed to allay or overcome the irritating effect of aspirin on the gastric mucosa has been to mix the aspirin with antacids or buffers. A recent editorial in the British Medical Journal[10] reviews the work of Batterman[8] and Cronk[9] and concludes: "Taken together, these two studies appear to dispose of the claims which have been put forward in support of buffered aspirin tablets."

Success in reducing the drawbacks of plain or buffered aspirin has been achieved with new, soluble Calurin. This is the freely soluble, stabilized calcium aspirin. The high solubility of Calurin assures faster, higher salicylate blood levels with virtually no risk of damage to the gastric mucosa, such as local hyperemia and ulceration. Calcium aspirin does not have the irritant action of regular aspirin[4] and it "...has certain advantages over acetylsalicylic acid in that it is more soluble in water, more readily absorbed, has less tendency to produce an albuminuria and is apparently less toxic..."[11]



Salicylate blood levels more than twice as high within 10 minutes were found in a comparison between Calurin and plain aspirin.[12] This investigation with 12 subjects also showed that the salicylate levels persisted higher for at least two hours. These results are depicted in the above chart. In reporting comparative studies between plain and buffered aspirin, Cronk[9] states: "The salicylic acid blood concentrations in the 20 human volunteers after the administration of 0.6 gm. of buffered or nonbuffered acetylsalicylic acid were essentially identical."

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Battenfeld Memorial Auditorium

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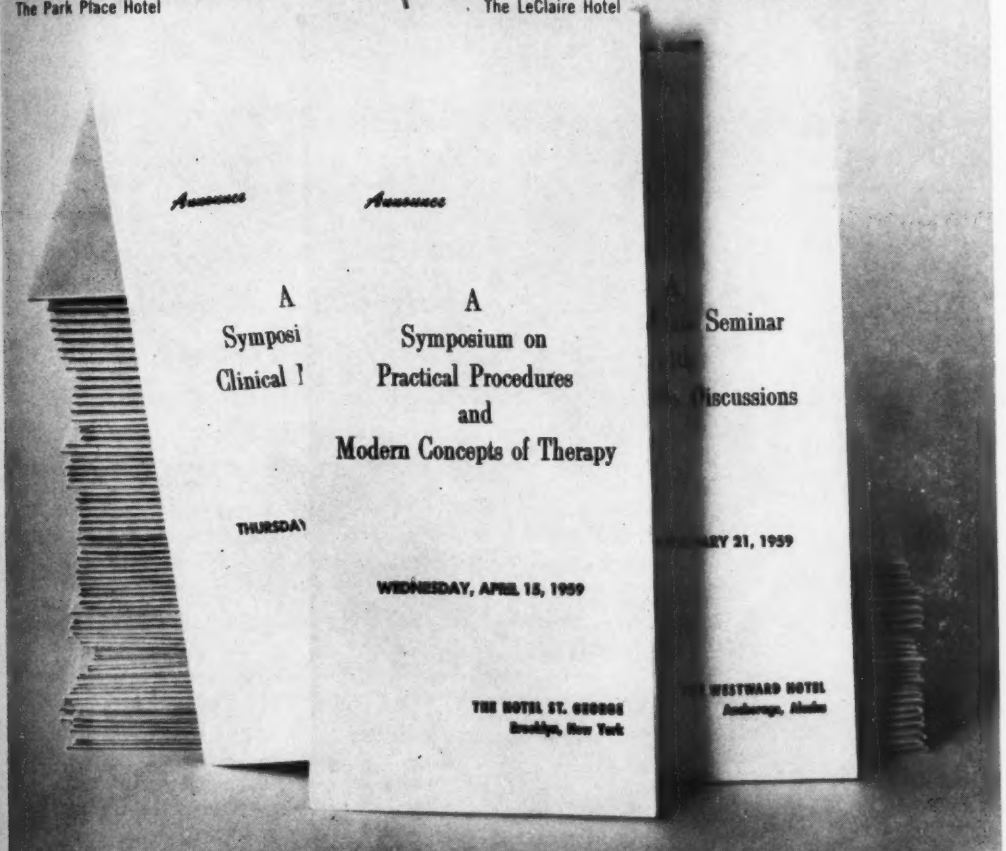

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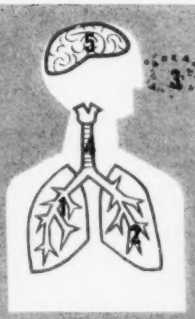

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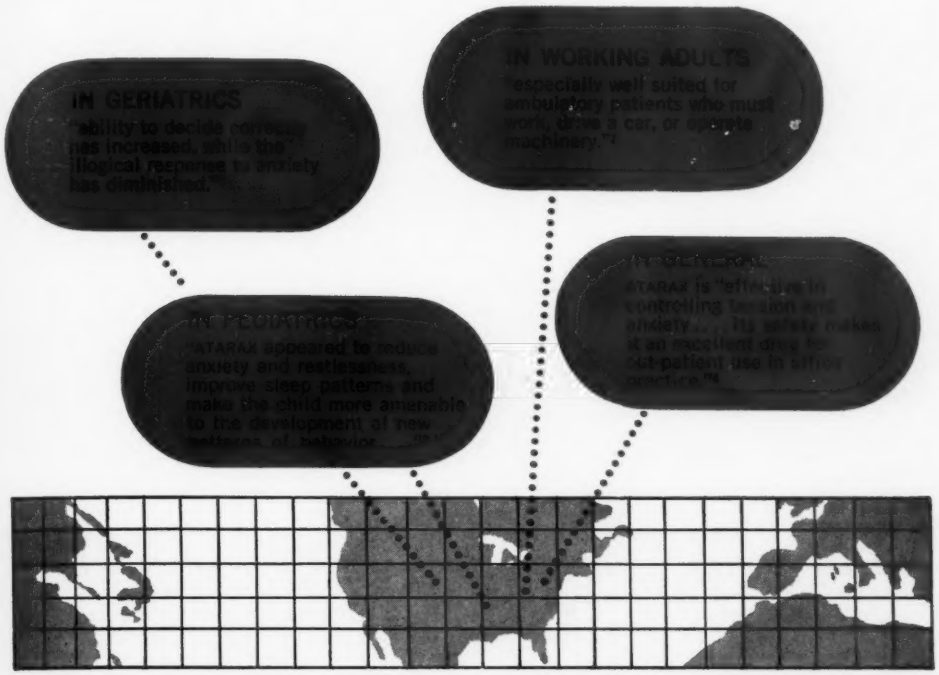

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For childhood behavior disorders	10 mg. tablets Syrup	3-6 years, one tablet t.i.d. over 6 years, two tablets t.i.d. 3-6 years, one tsp. t.i.d. over 6 years, two tsp. t.i.d.
For adult tension and anxiety	25 mg. tablets Syrup	one tablet q.i.d. one tbsp. q.i.d.
For severe emotional disturbances	100 mg. tablets	one tablet t.i.d.
For adult psychiatric and emotional emergencies	Parenteral Solution	25-50 mg. (1-2 cc.) intramuscularly, 3-4 times daily, at 4-hour intervals. Dosage for children under 12 not established.

Supplied: Tablets, bottles of 100. Syrup, pint bottles. Parenteral Solution, 10 cc. multiple-dose vials.

References: 1. Smigel, J. O., et al.: J. Am. Ger. Soc., in press. 2. Freedman, A. M.: Pediat. Clin. North America 5:573 (Aug.) 1958. 3. Ayd, F. J., Jr.: New York J. Med. 57:1742 (May 15) 1957. 4. Menger, H. C.: New York J. Med. 58:1684 (May 15) 1958. 5. Coirault, M., et al.: Presse méd. 64:2239 (Dec. 26) 1956. 6. Bayart, J.: Presented at the International Congress of Pediatrics, Copenhagen, Denmark, July 22-27, 1956.

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Science for the World's Well-Being

QUADRINAL

- bronchodilator and expectorant

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- bronchial asthma

QUADRINAL

- pulmonary emphysema

QUADRINAL

- other chronic respiratory disease with bronchospasm and wheezing

Prompt — Long-lasting — Economical

FORMULA:

Ephedrine HCl	3/8 grs. (24 mg.)
Phenobarbital	3/8 grs. (24 mg.)
"Phyllicin" (theophylline-calcium salicylate)	2 grs. (120 mg.)
Potassium Iodide	5 grs. (0.3 Gm.)

DOSAGE: The usual dose of **QUADRINAL** is 1 tablet every three or four hours during the day and, if needed, another tablet upon retiring for relief during the night.

For children, ½ tablet three times a day.

QUADRINAL is available on prescription only.

QUADRINAL tablets (7-¾ grs. each) bottles of 100, 500, and 1000.

Quadrinal, Phyllicin®, E. Bilhuber, Inc.

KNOLL PHARMACEUTICAL COMPANY
(formerly Bilhuber-Knoll Corp.)
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Fulfills Both Needs
for the Anginal Patient

FEWER
▶ LESS SEVERE
ATTACKS

▶ FREEDOM
FROM FEAR

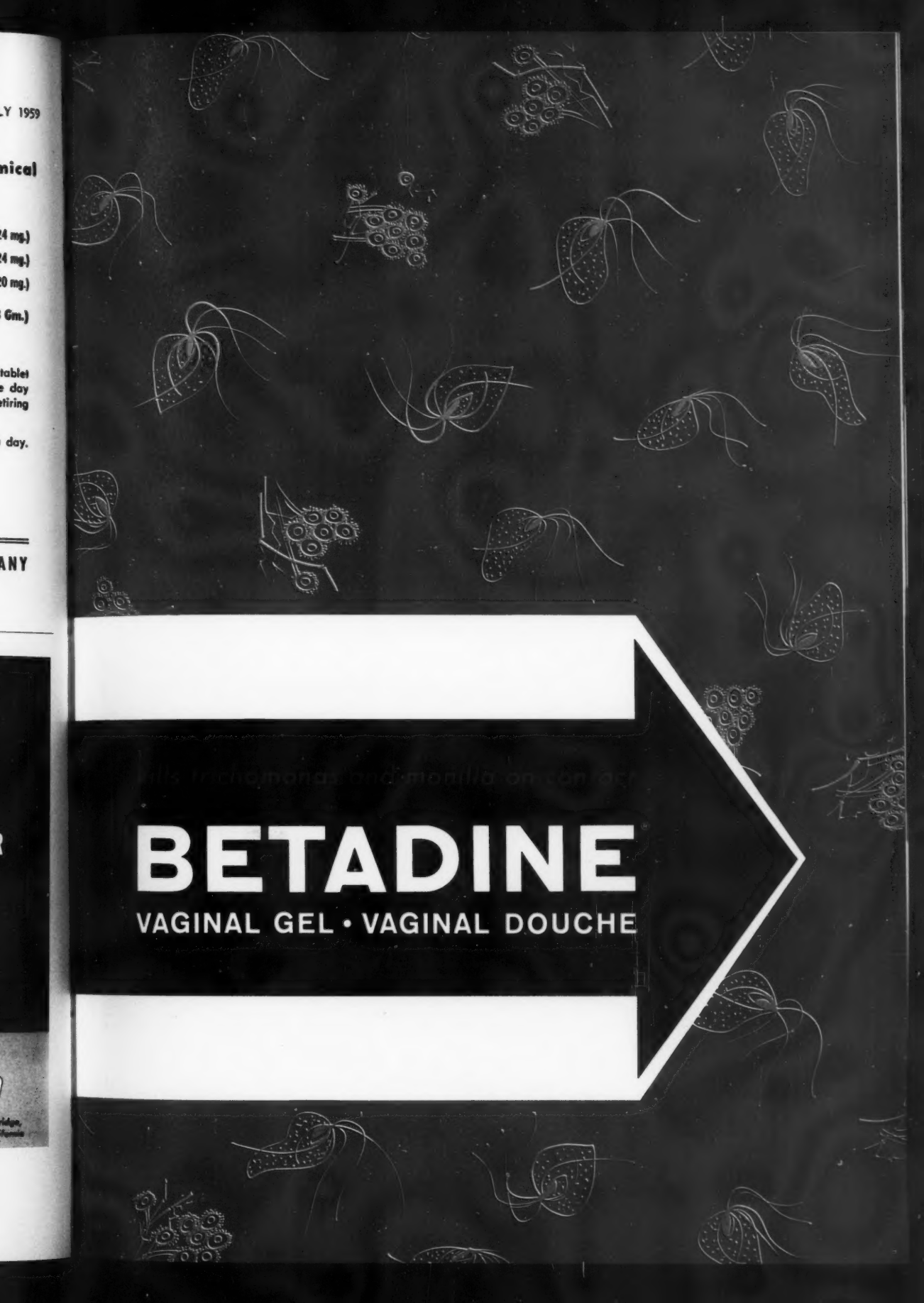
Pentoxylon

Tablets Containing Pentaerythritol Tetranitrate (PETN) 10 mg. and Rauwiloid® (Alseroxylon) 0.5 mg.

Patients with angina pectoris need BOTH types of protection afforded by Pentoxylon...prolonged coronary vasodilatation AND relief from anxiety. Fear of the next attack is replaced by pulse-slowing, calming action.

DOSAGE: 1 to 2 tablets q.i.d. before meals and on retiring.

Riker
Northridge, California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VAGINAL GEL • VAGINAL DOUCHE

BETADINE

brand of Povidone-Iodine, possesses broad-range germicidal activity against fungi, yeasts, bacteria, protozoa, and viruses. In the vaginal tract Betadine Vaginal Gel and Betadine Vaginal Douche kill trichomonas and monilia on contact and destroy common pathogens. Betadine is virtually nonirritating to vaginal mucosa.

indicated:

in the treatment of trichomoniasis, moniliasis and nonspecific vaginitis.

advantages:

- almost immediate relief from leukorrhea, pruritus; diminishes malodor
- unsurpassed broad-range microbicidal activity
- therapeutically active even in the presence of blood, pus, vaginal secretions
- wetting action to assist penetration into vaginal crypts and crevices

how to use:

In the office: Swab the vaginal vault with Betadine Antiseptic, full strength.

prescribe Betadine Vaginal Douche for therapeutic use as follows: Two (2) tablespoonfuls to a quart of lukewarm water once daily by the patient at home, for six days. On the seventh day, the patient returns for re-examination and swabbing with Betadine Antiseptic; an additional week of therapeutic douching if necessary.

prescribe Betadine Vaginal Gel as follows: Insert one (1) applicatorful of Betadine Vaginal Gel each night, followed by a douche the next morning, through the entire menstrual cycle. If further therapy is warranted, the gel should be continued only during the actual menses days of the following two menstrual periods.

After the infection has been brought under control, the use of Betadine Vaginal Douche is recommended twice weekly at a dilution of one (1) tablespoonful to a quart of lukewarm water.

established in 1905

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3 OZ. TUBE WITH APPLICATOR

BETADINE® VAGINAL DOUCHE

8 OZ. BOTTLE

over 36 females
and over 13 males
in every 1,000
are chronically
constipated*

3 physiologic
-way action
CHOLERETIC
DIGESTANT
LAXATIVE
for treating
chronic constipation

CAROID AND BILE SALTS TABLETS act to restore the normal pattern of elimination. Bile salts help overcome the biliary stasis so common in the chronically constipated; Caroid, a potent enzyme, increases protein digestion as much as 15%; and mild laxatives improve peristaltic rhythm and tone—keep stools soft and well formed.

*Modern Medicine Topics, vol. 19, no. 7 (July) 1958.

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RESTORE REGULARITY WITHOUT IRRITATION, GRIPING OR FLATULENCE

SAMPLES ON REQUEST

AMERICAN FERMENT CO., INC. • 1450 Broadway • New York 18, N. Y.

Continued from page 51

MISSOURI

Two new appointments at the University of Missouri Medical Center are Dr. Roy E. Mason, Clinical Professor of Ophthalmology and Dr. Jona Carl Thaemert, Assistant Professor of Anatomy.

Drs. Philip L. Byers and T. Reid Jones, Kansas City, have been elected Fellows of the American College of Physicians.

Dr. Richard E. Lord has been elected Secretary of the St. Louis Orthopedic Society.

Dr. Joseph A. Costrino, St. Louis, has been elected as a Fellow of the Industrial Medical Association. The elevation to Fellowship is "recognition for outstanding work in the field of industrial medicine."

Drs. James Sisk and R. M. Feldaker have been appointed Consultants in Dermatology, Washington University, Division of City Hospital. Dr. Feldaker also was recently appointed Instructor in Clinical Dermatology at Washington University.

The Missouri State Medical Association has elected as officers: President-Elect, Dr. R. O. Muether, St. Louis; Vice-Presidents, Dr. James Meador, St. Louis County, Dr. G. D. Shull, Jefferson City, and Dr. J. J. Wimp, Kirksville; Secretary, Dr. John I. Matthews, Jefferson City; and Treasurer, Dr. Charles R. Doyle, St. Louis.

New officers of the Greater St. Louis Society of Radiologists include: Dr. Thomas F. Maher, President; Dr. Charles J. Cherre, Vice-President; and Dr. Harvey A. Humphrey, Secretary-Treasurer.

Officers elected at the recent annual meeting of the St. Louis Clinical Diabetes Society are: Dr. George A. Mahe, President; Dr. Paul J. Bettonville, Vice-President; and Dr. Sidney Goldberg, Secretary-Treasurer.

The St. Louis Medical Society's Honor Award for 1959 has been presented to Dr. George H. Bishop, Professor Emeritus of Neurophysiology at Washington University School of Medicine. The Award of Merit and a Gold Medal were presented "for his contributions to fundamental knowledge of the nervous system, his astute application of the principles of physics and engineering to problems in neurophysiology, and his devotion to original physiologic investigation (that) have greatly advanced the scientific basis of medicine."

Dr. George V. Feist has been selected by the Kansas City Academy of General Practice as the "General Practitioner of the Year."

Dr. Harry K. Cohen has been installed as President of the Kansas City Academy of General Practice. Other officers include: Dr. Frank A. O'Connell, President-Elect; Dr. J. Max Haight, Secretary; and Dr. Edward A. Samuelson, Treasurer.

The Kansas City Urological Society has elected as officers: President, Dr. Walter Mau, Topeka; Vice-President, Dr. James F. O'Malley; and Secretary, Dr. Milton Ozar.

Dr. J. M. Martt, Columbia, has been notified that he has been certified by the American Board of

Continued on page 62

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HILL CREST SANITARIUM

Established in 1925

FOR NERVOUS AND MENTAL DISEASES
AND ADDICTION PROBLEMS

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when pollen allergens attack the nose...

Triaminic provides more effective therapy in respiratory allergies because it combines two antihistamines[1,2] with a decongestant.

These antihistamines block the effect of histamine on the nasal and paranasal capillaries, preventing dilation and exudation.[3] *This is not enough;* by the time the physician is called on to provide relief, histamine damage is usually present and should be counteracted.

The decongestive action of orally active phenylpropanolamine helps contract the engorged capillaries, reducing congestion and bringing prompt relief from nasal stuffiness, rhinorrhea, sneezing and sinusitis.[4,5]

TRIAMINIC is orally administered, systemically distributed and reaches *all* respiratory membranes, avoiding nose drop addiction and rebound congestion.[6,7] TRIAMINIC can be prescribed for prompt relief in summer allergies, including hay fever.

References: 1. Sheldon, J. M.: Postgrad. Med. **14**:465 (Dec.) 1953. 2. Hubbard, T. F. and Berger, A. J.: Annals Allergy p. 350 (May-June) 1950. 3. Kline, B. S.: J. Allergy **19**:19 (Jan.) 1948. 4. Goodman, L. S. and Gilman, A.: Pharmacol. Basis Ther., Macmillan, New York, 1956, p. 532. 5. Fabricant, N. D.: E.E.N.T. Monthly **37**:460 (July) 1958. 6. Lhotka, F. M.: Illinois M.J. **112**:259 (Dec.) 1957. 7. Farmer, D. F.: Clin. Med. **5**:1183 (Sept.) 1958.

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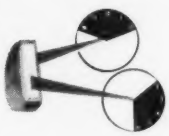
TRIAMINIC provides around-the-clock freedom from hay fever and other allergic respiratory symptoms with just one tablet q. 6-8 h. because of the special timed-release design.



Each TRIAMINIC timed-release tablet provides:

Phenylpropanolamine HCl	50 mg.
Pheniramine maleate	25 mg.
Pyrilamine maleate	25 mg.

Also available: TRIAMINIC SYRUP for those patients of all ages who prefer a liquid medication. Each 5 ml. teaspoonful is equivalent to ¼ Triaminic Tablet or ½ Triaminic Juvelet. TRIAMINIC JUVELETS provide half the dosage of the Triaminic Tablet with the same timed-release action for prompt and prolonged relief.

STOP *running noses* *and open stuffed noses orally*

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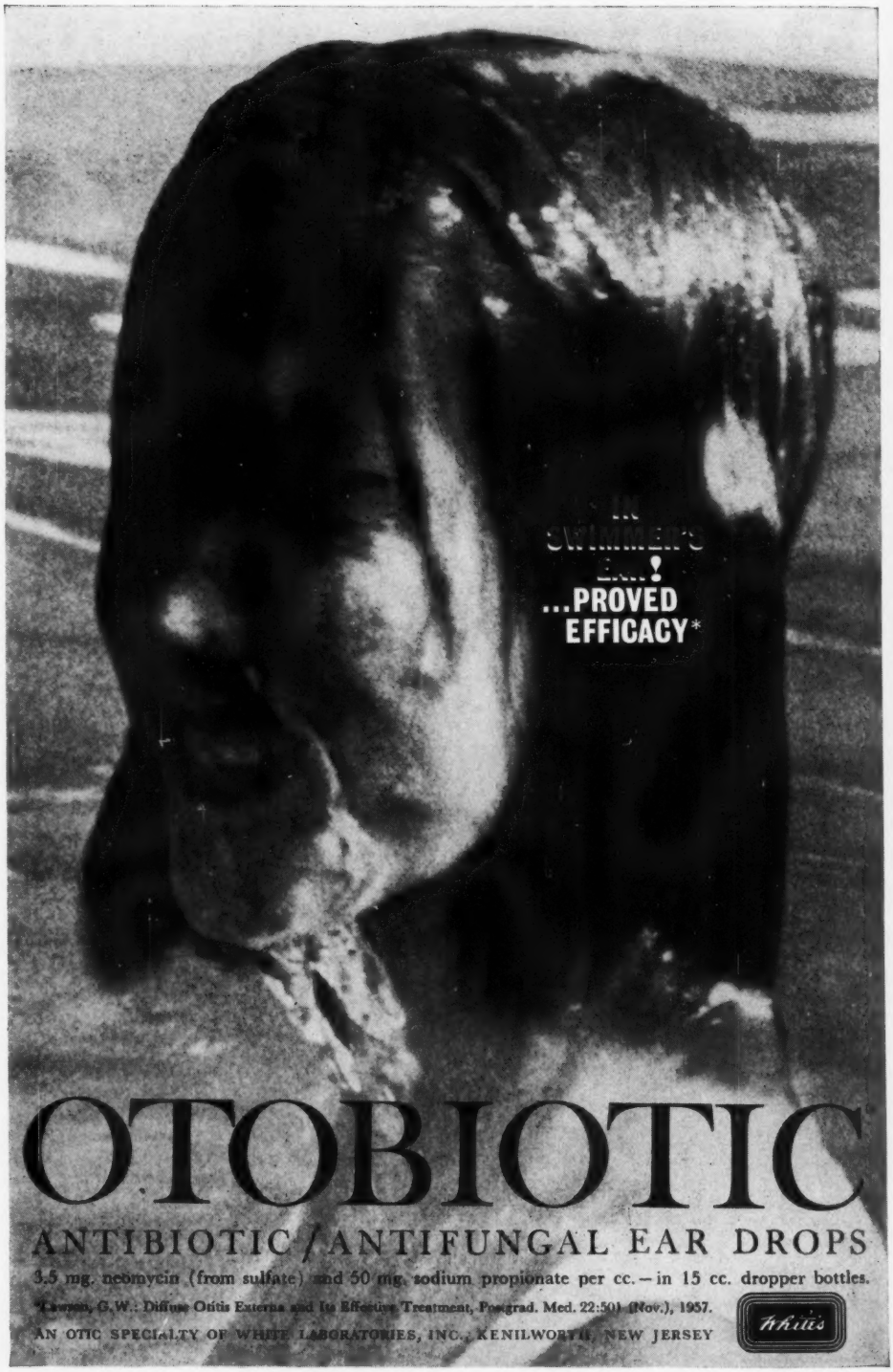
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ANTIBIOTIC / ANTIFUNGAL EAR DROPS
3.5 mg. neomycin (from sulfate) and 50 mg. sodium propionate per cc. — in 15 cc. dropper bottles.
*Lawson, G.W.: Diffuse Otitis Externa and Its Effective Treatment, Postgrad. Med. 22:501 (Nov.), 1957.
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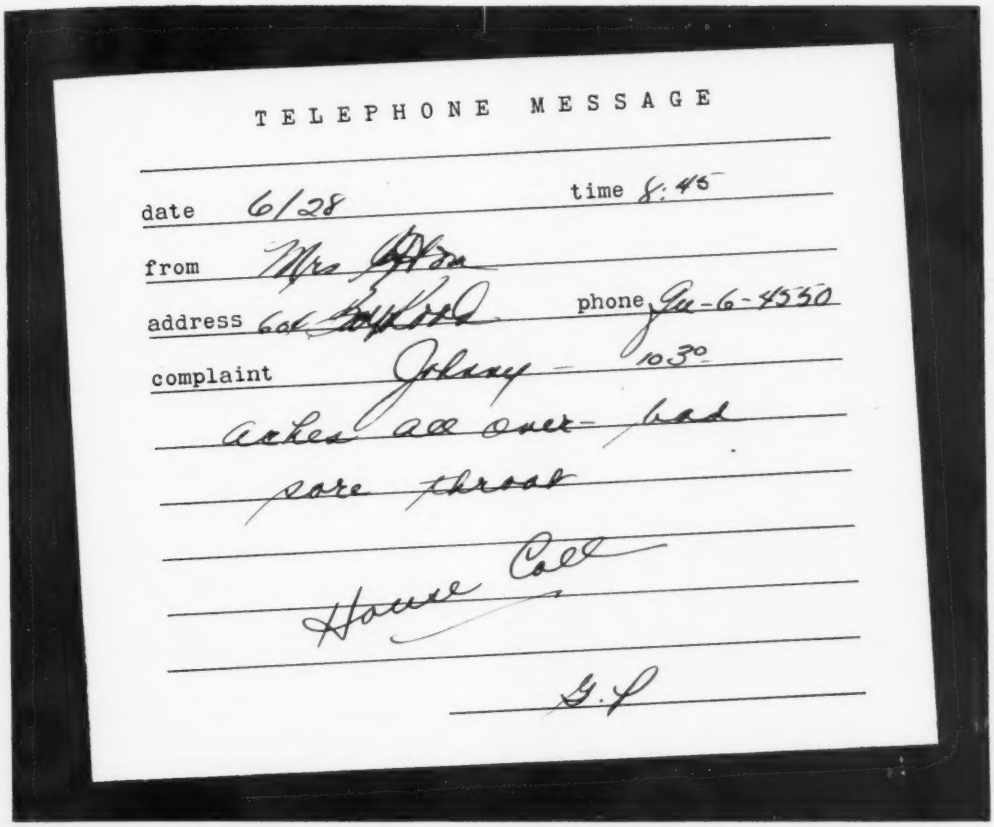

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More than 90 clinical references attest to the superiority and effectiveness of Cosa-Signemycin (Signemycin). Bibliography and professional information booklet available on request.

CAPSULES: *125 mg., 250 mg.*

ORAL SUSPENSION: *raspberry flavored, 2 oz. bottle, 125 mg. per teaspoonful (5 cc.)*

PEDIATRIC DROPS: *raspberry flavored, 10 cc. bottle (with calibrated dropper), 5 mg. per drop (100 mg. per cc.)*

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potentiation • efficacy • toleration

in broad-spectrum antibiotic therapy

COSA-TERRAMYCIN®
oxytetracycline with glucosamine

capsules	oral suspension	pediatric drops
125 mg.	peach flavored,	peach flavored,
250 mg.	125 mg. per teaspoonful (5 cc.),	100 mg. per cc. (5 mg. per drop)
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Continued from page 58

Cardiovascular Disease, a subspecialty board of the American Board of Internal Medicine.

The following officers were elected by the staff of St. Joseph's Hospital, Kansas City: President, Dr. John A. Growdon; President-Elect, Dr. W. W. Gist; Secretary, Dr. H. E. Linville; and Treasurer, Dr. H. H. Virden.

Dr. George J. L. Wulff, Jr., St. Louis, has been elected President of the St. Louis Gynecological Society. Dr. Roy Boedeker was elected Vice-President; Dr. Bryce Bondurant, Secretary; and Dr. A. C. Trueblood, Treasurer.

The Austrian Dermatological Society has notified Dr. Ernest Spitzer, St. Louis, that he has been elected an honor member of the Society.

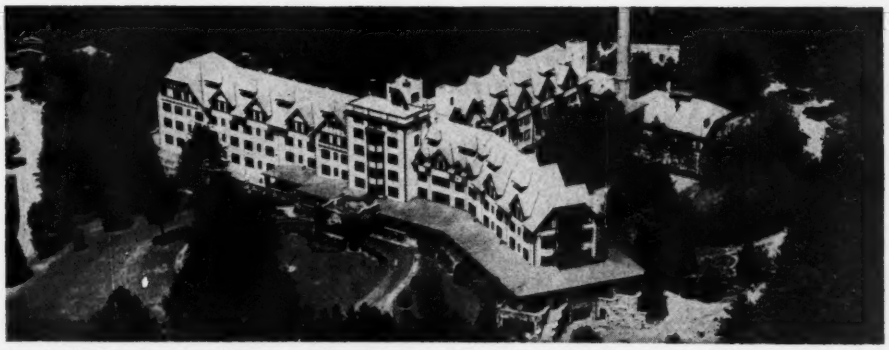
The Menorah Medical Center, Kansas City, elected as officers: President, Dr. Harold Passman; President-Elect, Dr. Bela Kent; Secretary, Dr. David Waxman; and Treasurer, Dr. Alexander Lichtor.

Dr. Joseph E. Flynn, Columbia, has been appointed Chairman of a medical education committee of the Leukemia Guilds of Missouri and Illinois.

NORTH CAROLINA

Dr. Henry McIntosh, Duke Medical School, Durham, has been elected President-Elect of the North Carolina Heart Association, and Dr. Glenn Sawyer, Bowman-Gray School of Medicine, Winston-Salem, was chosen Vice-President.

Appalachian Hall • Established 1916 Asheville, North Carolina



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Insulin Coma, Insulin Sub-Shock, Electroshock and Psychotherapy are employed. The Institution is equipped with complete laboratory facilities including electroencephalography and X-ray.

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Robert A. Griffin, M.D.
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Mark A. Griffin, Jr., M.D.

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New officers of the Medical Alumni Association of the University of North Carolina School of Medicine are Dr. John Rhodes, Raleigh, President-Elect; Dr. W. H. Kibler, Morgantown, Vice-President; and Drs. Tom G. Thurston, Salisbury, John Mewborn, Farmville, and H. M. Riggins, New York, Counselors.

Dr. Charles H. Burnett, Professor and Head of the Department of Medicine, University of North Carolina School of Medicine, has been elected a member of the American Academy of Arts and Sciences. Dr. Burnett is one of seven new members elected in the field of medicine.

Dr. William J. Cromartie and Dr. Colin G. Thomas, Jr., have been elected as alumnus members of the national medical honor society, Alpha Omega Alpha, at the University of North Carolina School of Medicine.

OKLAHOMA

Dr. William S. Dandridge, Muskogee, has been appointed as a member of the American College of Surgeons Committee on Trauma for Oklahoma.

Dr. Ralph Simon, Clinton, has recently been named as a member of the Board of Directors of the Oklahoma Division, American Cancer Society.

Dr. Onis Franklin, Broken Arrow, has been named Tulsa County's "Doctor of the Year" by the Auxiliary to the Tulsa County Medical Society.

Dr. Hayden H. Donahue, Director of Mental Health for the State of Oklahoma has recently been appointed by Governor J. Howard Edmondson to the Southern Regional Council on Mental Health Training and Research of the Southern Regional Education Board.

SOUTH CAROLINA

Dr. William Weston, Jr., Columbia, has been installed as President of the South Carolina Medical Association. Dr. Joseph P. Cain, Mullins, was elected President-Elect; Dr. Clay Evatt, Charleston, Vice-President; Dr. Robert Wilson, Charleston, Secretary; and Dr. J. Howard Stokes, Treasurer.

Dr. Robert F. Hagerty, Assistant Professor of Medicine at the Medical College of South Carolina, has been named President-Elect of the Southeastern Society of Plastic and Reconstructive Surgeons.

Dr. Ambrose G. Hampton, Jr., Columbia, has been appointed to the staff of the American Hospital of Paris for one year. The appointment is a signal honor as the 32 year old physician was chosen from doctors throughout the country.

TENNESSEE

The Tennessee State Orthopaedic Society has elected as officers: Dr. George W. Shelton, President; Dr. W. Houston Price, Vice-President; and Dr. Maurice A. Canon, Secretary-Treasurer.

Dr. Donald Zilversmit, Professor of Physiology, University of Tennessee, Memphis, was named the seventh "Career Investigator" of the American Heart Association. Career investigators are "outstanding scientists"

Continued on page 64

QUIETING...
HYPOTENSIVE
without a chain of side actions
Butiserpine®
a conservative, safe amount of reserpine (0.1 mg. per tablet or teaspoonful) combined with 15 mg. BUTISOL sodium® butabarbital sodium.
Butiserpine Tablets, Elixir, Prestabs® Butiserpine R-A (Repeat Action Tablets)
Maintenance Dosage:
Tablets or Elixir one or two tabs. or tsp. daily. Prestabs Butiserpine R-A one tab. daily.
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Continued from page 63

who receive support from the American Heart Association throughout their productive lives.

The following are officers of the Nashville Academy of Medicine for 1959: President, Dr. Rollin A. Daniel, Jr., and Secretary-Treasurer, Dr. Douglas H. Riddell.

The Tennessee State Medical Association has selected Dr. Frank Thomas Mitchell as Tennessee's outstanding physician of the year. He was selected because of "his tremendous contribution to child health during the past 40 years and the fine influence he has exerted on literally thousands of students at the Universtiy of Tennessee."

"For basic research on how tumors and cancers behave and grow," Dr. Stanfield Rogers, Director of Memorial Research Center of the University of Tennessee, Knoxville, received the third annual award of the American Society for Experimental Pathology.

Dr. Lewis A. Schmidt III, Chattanooga, was recently certified as a Diplomate of the American Board of Surgery.

Dr. Cyrus C. Erickson, Memphis, has been elected President of the American Society for Experimental Pathology.

Dr. Charles Meadows Clark, McMinnville, has been named District Governor of the Tennessee District of Rotary International.

Dr. Andrew H. Crenshaw, Memphis, is one of four orthopedic surgeons in the U. S. selected as an exchange fellow for a seven week visit to England.

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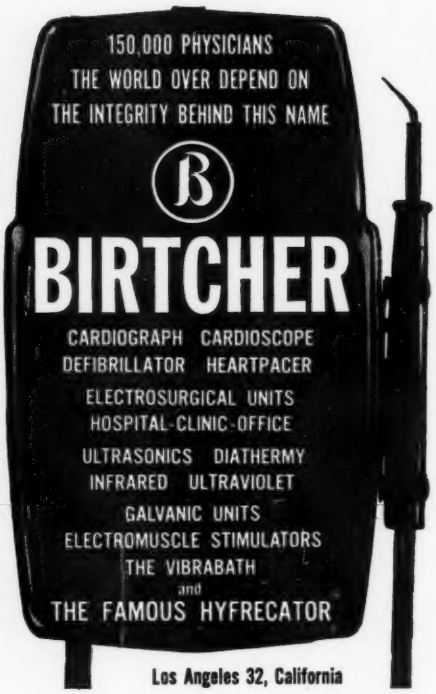

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and abrasions

The water-soluble, nonstaining base melts on contact with the tissue, releasing the Xylocaine for immediate anesthetic action. It does not interfere with the healing processes.

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XYLOCAINE®
(brand of lidocaine*)
OINTMENT 2.5% & 5%

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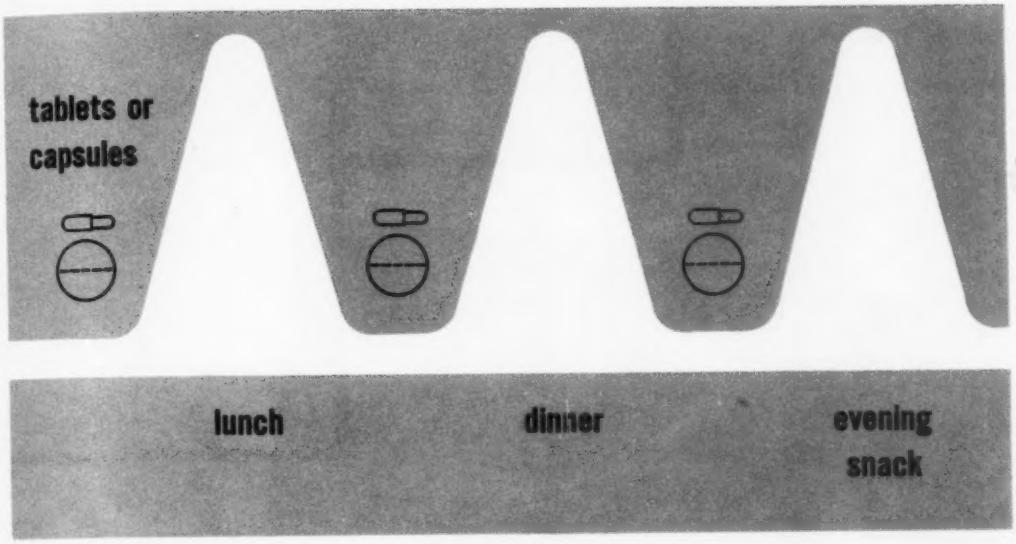
SEE PDR

for dependable control of appetite ... a flexible dosage form



The Obedrin formula permits a flexible dosage schedule which depresses the appetite when it is most important to do so—at peak hunger periods. The physician can adjust the dosage to fit each patient's need.

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advantages of Obedrin

A dependable anorexigenic agent

A flexible dosage form

Minimal central nervous stimulation

Vitamins to supplement the diet

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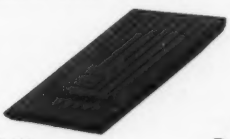

Write for 60-10-70 menus, weight charts, and samples of Obedrin.

Used with the 60-10-70 Basic Plan, Obedrin offers an ideal weight-control regimen for the overweight patient.

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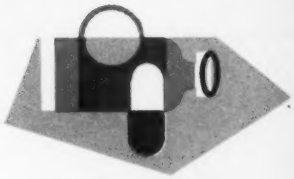
three essential steps help overweight patients eat to live, not live to eat

supervision by the physician

a balanced eating plan



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provide an effective weight control regimen

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Pentobarbital, 20 mg., to guard against excitation

Thiamine Mononitrate, 0.5 mg., Riboflavin, 1 mg. and Nicotinic Acid (Niacin), 5 mg., to supplement the diet

Ascorbic Acid, 100 mg., to help mobilize tissue fluids

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The ethical principles laid down by this ancient preceptor guide the modern physician, whose chief concerns are the welfare of his patients and careful study of their individual needs. With the aid of today's scientific discoveries, your physician is able to provide the finest medical care the world has ever known.
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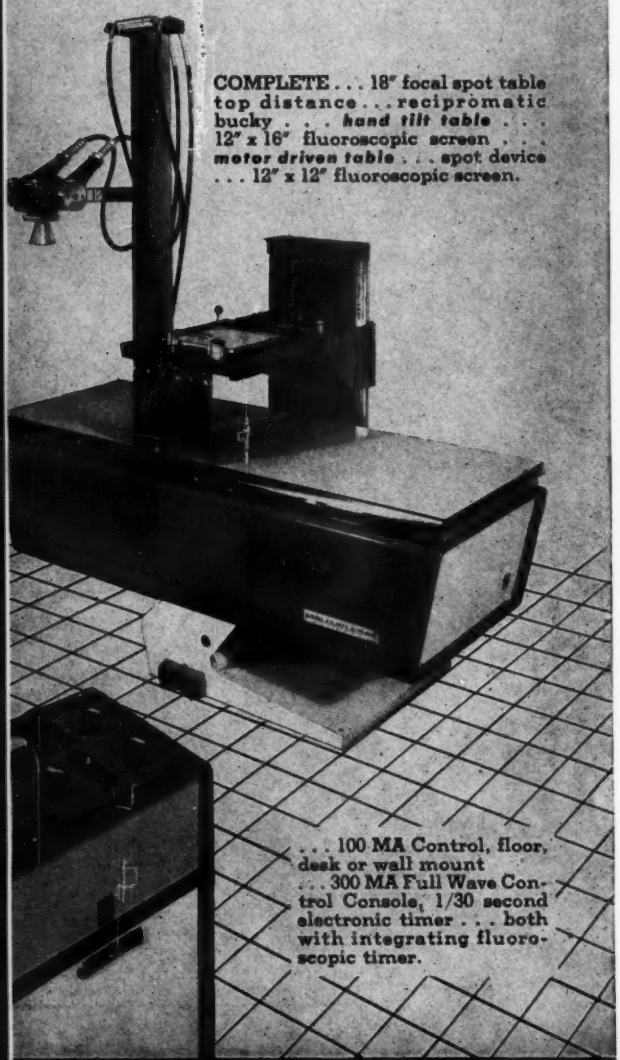

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Continued from page 64

Dr. Sam H. Sanders, Jr., Memphis, has been made a member of the American Laryngological Association.

Dr. William Brady Camp, Kingsport, has been elected a Fellow of the Industrial Medical Association.

TEXAS

Dr. Milford O. Rouse, Dallas, President of the Southern Medical Association, was elected Vice-Speaker of the House of Delegates of the American Medical Association during the AMA's Annual Meeting in Atlantic City last month.

Dr. May Owen, Fort Worth, will become the first woman President of the Texas Medical Association in 1960. She was named President-Elect of the Association during its Annual Meeting in San Antonio. The only other woman physician to ever be accorded a similar honor was Dr. Leslie S. Kent, who was President of the Oregon State Medical Society in 1948. Dr. Owen is a member of the Southern Medical Association's Committee on Scientific Work.

Dr. Oscar M. Marchman, Sr., Dallas, aged 87, died May 24. Dr. Marchman became a member of the Southern Medical Association in 1913 and served in many official capacities, including that of First Vice-President in 1926 and Chairman of the Section on Ophthalmology and Otolaryngology in 1938. He was also Vice-General Chairman on Arrangements for the Annual Meeting in Dallas in 1951. He had a fine record of attendance at annual meetings and was made an Honorary Member in 1953.

Two San Antonio physicians elected to the Board of Trustees of the San Antonio Medical Foundation are Dr. Walter Walthall and Dr. Harold Vagborg.

Dr. Homer E. Prince, Crockett, has been elected Vice-President of the American Academy of Allergy.

Dr. Stuart A. Wallace, Chairman, Department of Pathology, was presented with the George T. Caldwell Award, naming him "Pathologist of the Year for the State of Texas."

Continued on page 70

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1. Elsdon—Dew, R.: S. Afr. Med. J. 32:89 (Jan., 1958)
2. Webster, B. H.: Am. Pract. & Dig. Treat. 9:897 (June, 1958)
3. D'Antoni, J. S.: New Orleans Med. & Surg. J. 102:55 (Aug., 1949)
4. Rinehart, R. E., Marcus, H.: Northwest Med. 54:708 (July, 1955)

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JAMA, Mar. 28, 1953

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Continued from page 66

The Texas Tuberculosis Association has elected two physicians to its current slate of officers. They are Dr. Henry R. Hoskins, San Antonio, Vice-President, and Dr. Z. T. Scott, Austin, Treasurer.

Dr. Roy H. Morris, Jr., Elgin, has been elected President of the Elgin Board of Education.

Dr. R. Lee Clark, Jr., Director and Surgeon-in-Chief of the University of Texas M. D. Anderson Hospital and Tumor Institute, Houston, has received a 5 year appointment as Chairman of the Committee on Cancer of the American College of Surgeons.

Dr. Marvin D. Siperstein, Dallas, University of Texas Southwestern Medical School, has received the 1959 Marchman Award for outstanding achievement in research and teaching.

VIRGINIA

Dr. Albert J. Paquin, Jr., has been appointed Professor of Urology and Chairman of the Department of Urology, University of Virginia School of Medicine, Charlottesville.

Dr. George Margolis will join the faculty of the Medical College of Virginia as Professor and Chairman of the Department of Pathology this month. He is now Professor of Pathology at Duke University and is a former chief consultant in that field to the Veterans Administration.

Dr. Harold I. Nemuth has been named temporary

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*McLester, J. S., and Darby, W. J.: Nutrition and Diet in Health and Disease, ed. 6, Phila., Saunders, 1952, p. 198.

Chairman of the Department of Community Medicine at the Medical College of Virginia. He is replacing Dr. E. M. Holmes, Jr., until a permanent Chairman is selected.

Dr. Walter P. Adams, President of the Medical Society of Virginia, has appointed Dr. Paul Hogg, Newport News, as Councilor from the First District, to fill the unexpired term of Dr. Sheppard K. Ames, deceased.

WEST VIRGINIA

Dr. Myer Bogarad, Weirton, has been installed as President of the West Virginia Chapter of the American Academy of General Practice. Other officers are Dr. J. C. Arnett, Rowlesburg, Vice-President; Dr. J. Keith Pickens, Clarksburg, Secretary; and Dr. Don S. Benson, Moundsville, Treasurer.

Dr. R. J. Sexton, Nitro, Medical Director of the Institute Plant of Union Carbide Chemicals Company, has been awarded a Fellowship in the American Academy of Occupational Medicine.

Dr. Robert U. Drinkard, Jr., Wheeling, has been elected the West Virginia member of the Board of Governors of the American College of Physicians.

Dr. Richard J. Lilly, who for the past year has served as Superintendent of Weston State Hospital, has assumed his official duties as Director of the Department of Mental Health of West Virginia.

Dr. Thomas J. Holbrook, Huntington, has been elected a Vice-President of the Neurosurgical Society of America.

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"...of 303 gynecologic patients [premenstrual tension, dysmenorrhea, menstrual irregularity, postmenstrual tension] ... a total of 90 per cent of the cases were benefited by the use of this drug [Bellergal]." *(MacFadyen, B. V.: Am. Pract. & Digest. Treat. 2:1028, Dec. 1951.)*

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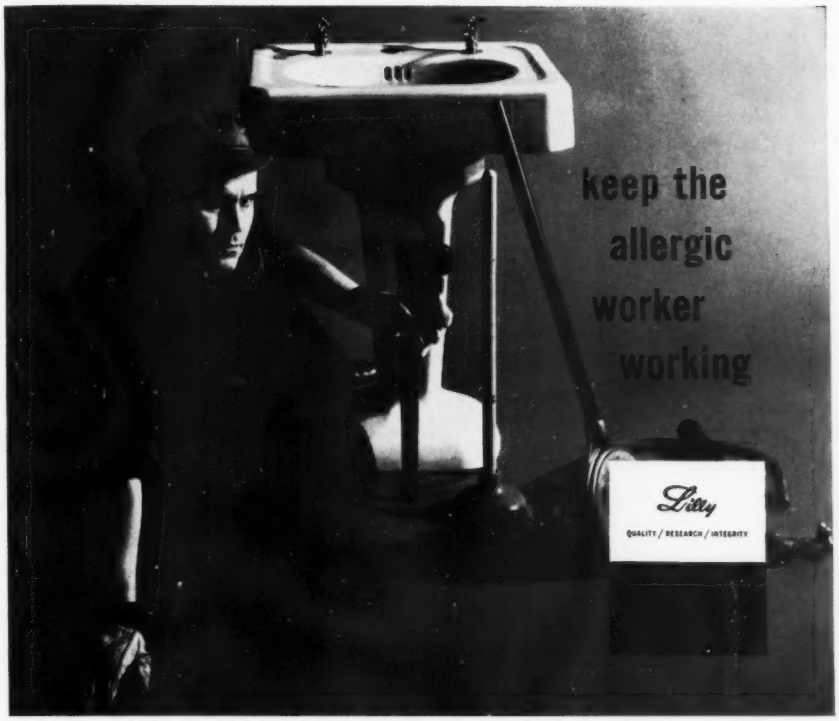

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